RAILROAD GAZETTE

FRIDAY, APRIL 10.

Contributions.

The Invention of Angle Fish-plates.

The Pennsylvania Railroad Company,
PHILADELPHIA, March 23, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to my letter of Feb. 13, it was not my intention to claim the invention of the angle splice at all.

We obtained the idea of the angle splice from one of our supervisors by the name of James McKnight, who was stationed at Mifflin on the Middle Division of the Pennsylvania Railroad, who had a wooden model made of the angle splice substantially the same as has been in use on the road up to this time. This wooden model was made as early as 1867, for to my certain knowledge it lay around the office of the Supervisor at Harrisburg for two or three years previous to 1870, and there are several officers still in the service of the Pennsylvania Railroad who can testify to the correctness of this statement. WM. H. BROWN, Chief Engineer.

The Massachusetts Overhead Bridge Law.

BOSTON, April 3, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the "Scrap Heap" of the last *Railroad Gazette* is a paragraph copied from a Boston paper giving the finding of Judge Churchill on the death of a brakeman killed by an overhead bridge on the Eastern Railroad. Judge Churchill spoke in apparent ignorance of the facts and the law in regard to overhead bridges in Massachusetts. The bridge in question was constructed many years ago, when rolling stock was somewhat lower than it is now, and there was no law regulating the height of such structures. But in 1869 a law was passed requiring all bridges over railroads thereafter constructed to be at least 18 ft. above the tracks. And in 1870 another law was passed requiring the corporations to maintain "bridge guards" or "tell-tales" on each side of all bridges less than 18 ft. above the track, to warn the brakemen of freight trains as they approach such a bridge. In the case referred to the tell-tale was in place and in working order, but it appeared by the testimony of a train hand passing on the opposite track, that the unfortunate brakeman went up from the caboose when it had passed the tell-tale and just as it reached the bridge. It would seem that a knowledge of the facts and the laws relating to overhead bridges might have led the Judge to use somewhat different language n his finding. C.

The Disposition of the Hoosac Tunnel.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The committee of the Massachusetts Legislature on the Hoosac Tunnel have concluded their public hearings on the question of the disposition of the State road, including the Tunnel. At the earlier hearings a bill was submitted and advocated by State Treasurer Gleason, providing for a consolidation of the Fitchburg, the Central Massachusetts and the State road (Troy & Greenfield) making a line owned by one corporation from Boston to the state line in Williamstown. The bill apparently meets with the approval of the railroad corporations concerned, but it is somewhat doubtful if the third party, the state, will consent to the terms upon which its property is to be absorbed by the new corporation. Another bill for the consolidation of the same roads under one management was submitted by Mr. H. A. Blood; but the scheme is entirely different from Mr. Gleason's, and the state's interest is buried under thirty millions of stock and bonds, which will not commend it to those who set a value on the tunnel somewhat proportionate to its cost. It is a financiering project which does not receive much countenance from practical men.

At the last hearing, which was given for this special purpose, Mr. Edward Crane submitted another project of consolidation, more comprehensive than the others, as it includes not only the Fitchburg, the Central Massachusetts and the State roads, but the Boston & Albany and the Boston & Lowell also. The bill contains as corporators a marvelous array of names of gentlemen prominent in business or in public life; but it seems hardly credible that they should all indorse the scheme, and it is quite likely to turn out that few of them knew anything about it. But even if they were all enlisted in it, more than their influence would be required to overcome the popular prejudice against the consolidation of competing lines. The state was induced to burrow through the Hoosac Mountain in order to break a "monopoly" of western traffic, and though public opinion on competition and consolidation has been essentially modified since the Hoosac Tunnel was commenced, the average Massachusetts man is not yet prepared to surrender that costly work practically into the control of foreign connections with its more successful rival, especially when he sees that the business interests of the state are at last deriving some benefit from it.

It is not worth while to consider the details of these bills, as neither may be adopted by the Committee or the Legislature, though it is expected that a bill substantially like Mr. Gleason's may be reported. It is evident, however, that the actual consolidation provided for will not accomplish all that its projectors desire. In order that Boston or Massachusetts may derive the full advantage of consolidation, it should be extended in some form beyond the state line. But Boston capitalists have heretofore neglected more than one golden opportunity to absolutely secure that advantage, while they have built thousands of miles of railroads in the more distant West, and in Mexico.

The Brakemen of the Present Day.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The time was when brakemen were not only expected, but did ride on top of their trains. That time has passed. The brakemen of the present day think that if they are on top coming into stations they are doing all that is necessary. Our old conductors were not allowed, nor did they spend the better part of their time sitting comfortably in the caboose with their pipes in their mouths, which is not an uncommon occurrence on many of our roads at the present day.

Many accidents would be avoided if the men were compelled to ride on top, except in cases where their duty called them to the caboose. A few seconds in some cases would not only save a great deal of valuable property, but also the lives of the men themselves.

I will cite a not improbable accident which could be avoided by the men being outside and giving each other the signal for brakes. Let us suppose a long freight train of, say, 75 cars (not an unusual train for a consolidation engine), the head end of which has gone around a sharp curve in the road, and there is a high ledge of rocks between the front and hind ends, the wind is blowing strong in the direction the engine is moving, the engineer sees an obstruction on the track and whistles for brakes; who has heard him? Not the brakemen, for they are in the caboose, with every window and door closed tightly.

In my opinion, the brakemen should not only be made to ride outside, but the conductor should be required to go out at irregular intervals and make a signal which every brakeman would answer, thus showing that he was at his post. Some of the æsthetic brakemen would probably think this very hard, but the sooner any road gets rid of that class of men the better. Is it from them that the places of our old conductors will be filled? OUTSIDE.

Locomotive Fuel Consumption.

FRANKFORT-ON-MAIN, Feb. 11, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

An interesting paper reported in your journal July 4, 1884, gave some figures in regard to the comparative consumption of coal by English and American locomotives, making by no means a flattering showing for our engines and firemen.

I had hoped to see something further on the subject, but it does not seem to have aroused the interest it deserves, and I write in the hope of doing so.

The enormous difference stated did not *seem* fully explained by the features referred to in the paper nor by the handling of the fires.

If it is due to the latter, it is certainly high time that the art of firing is more fully developed with us.

The English consumption of coal, as I remember it, was about 60 per cent. of the American. I have not many statistics available, but I note from English returns that the "Locomotive Expenses" amount to 24 per cent. of the total cost of operating. Allowing that these include wages of engine hands, and assuming that the actual working expenses of the engines will be at least equal to the cost of maintenance and superintendence, and from other statistics setting the wages account and sundries for engines at one-third the total *running* expenses, the cost of fuel would be 8 per cent. of the total cost of operating in England. As Mr. Paine, in his valuable articles on railroad management, sets the fuel account at 9 to 10 per cent. of the total operating expenses in the United States, my figures seem to be reasonably correct in themselves, and indicate the same extravagance of fuel with us complained of.

Taking Mr. Paine's figure of 9 per cent., a saving of 40 per cent. on this would be a saving of 3.6 per cent. of the total expenses, or 19 per cent. of the dividends of all the railroads of the United States for 1883; so that the average dividend would be raised nearly one-fifth in amount—a statement sufficient to show how important the subject is to stockholders and managers.

I have gathered from your own paper some points bearing on the matter. The coal consumption of the Webb compound locomotives working the fast Irish and Scotch mails on easy grades—as given by Mr. Webb in your issue of Aug. 17, 1883—is 23.6 lbs. per mile to 34.6 of the ordinary Northwestern express engines.

A correspondent in your issue of Dec. 7, 1883, gives—apparently as a *good* record—the consumption of engine No. 17, Mobile & Ohio, equal to an average of 44 lbs. per mile for passenger service.

On the other hand, an interesting direct comparison of the working in Australia of American "Consolidation" and ordinary English engines is found in your issue of July 13, 1883. The "Consolidation" burned 54 lbs. per mile with a load of 418 tons, and the average consumption and loads of 23 English engines were 32 lbs. and 181 tons. The "Consolidation" pulled, therefore, 28 per cent. more load for equivalent coal burning. This would certainly tend to prove that the trouble is in American firing.

As to the merits of the respective types of construction of English and American boilers, there may have been a discussion at the time the Master Mechanics' Association obtained drawings of both from the principal designers in the two countries. If so, I missed it and must apologize for calling attention to the subject here.

The tendency in American practice, as here shown, is to reduce the number of boiler tubes—as exemplified particularly by Mr. Ely's practice. On this point the experiments rather imperfectly reported in the *American Machinist*, and quoted by you Aug. 31, 1883, seem to indicate that this tendency is correct.

There is also borne out by Mr. Frederick Siemens' paper to the English Iron and Steel Institute, published in *Engineering*, Dec. 19, 1884, in which he shows that for economical extraction of the heat of gas flame, it should not be crowded too closely against the surface to be heated. His theories seem particularly important for the Pittsburgh iron and steel manufacturers in connection with their extensive use of natural gas.

Apropos of heating surfaces, I see that in your paper of Dec. 5 a patent appliance for increasing the radiation of tubes is represented, consisting of coils of iron wire around the same. A similar appliance, but more likely to be efficient—that is, flanges of iron riveted to a fire-box—has been used for house-heating furnaces. Both seem to me fallacious in theory, since I doubt whether increase of exterior surface in such apparatus is of any material efficiency, when unaccompanied by any increase of the surface exposed to the direct action of the heating medium. If a record exists of experiments proving the contrary, I should be glad to learn where it can be found, and in general terms what the comparative advantage of such increase is.

In closing, I would remark that it seems strange that the average expense per railroad ton-mile should be as low as it is with us, if the consumption of fuel is really as unfavorable as is indicated above.

English and German engineers look very incredulous on hearing of operating expenses for all classes of goods averaging less than half a cent per ton-mile. I believe this figure is considered a minimum for profit in England for the transport of coal in full trains for long distances.

In regard to passenger rates on German railways, a correction should be made in my statement of last June, to the effect that round-trip tickets cost only one-half more than single rates, and as the vast majority of passengers take return tickets, the rates will average 20 to 25 per cent. less than those given by me. W. HOWARD WHITE.

[It is very difficult to make any comparison of economy of fuel where there are so many unknown elements. The English reports give the expenditures under the head of "Locomotive Power," which includes fuel, repairs, and wages of enginemen, firemen and wipers. Evidently the price of fuel and the rates of wages have a great effect on these. For the whole United Kingdom in 1883 the expenditures for "locomotive power" were 15.6 cents per train mile, on the average, being 16 9 cents in England and Wales, 14.5 in Scotland and 16.0 cents in Ireland. But there is no way of finding out what the average train-load is. Observation indicates that the average freight-train load is less in England than in this country, but what are known as "goods" trains there run faster than ours and the average haul is shorter, involving a greater proportion of switching, and more frequent starts and stoppages.

By the last census, fuel made 9 31 per cent. of the total working expenses of all the railroads of the United States, costing $32,836,470, while the total locomotive expenses (repairs, fuel, water, oil and waste and wages) were 24.96 per cent. of the whole, fuel being very nearly three-eighths. The total locomotive expenses per train-mile were 22.6 cents, which is 6 cents more than the expense in England. Here the expense for fuel was 8.43 cents per train-mile. But as we do not know the average train-loads in England, nor the average cost of fuel in either country, we should make but an imperfect comparison even if we had the cost of fuel per train-mile in England. What we want for that is the amount of work done per ton of coal in each country.

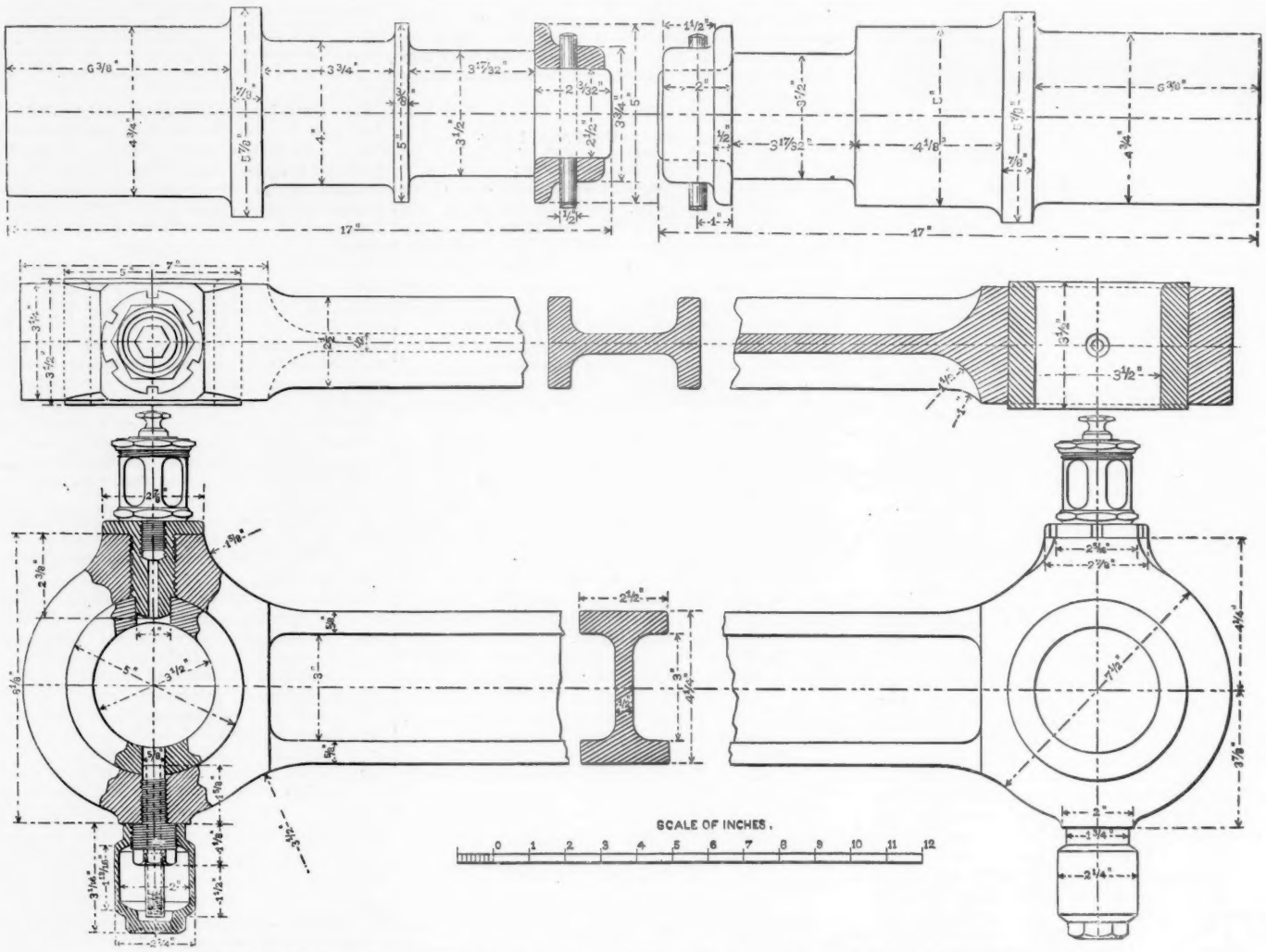
But the importance of economy of fuel is evident. A saving of a cent per train-mile on our railroads would have amountod to $3,890,000 in 1880, and we have nearly 50 per cent. more miles of road now, and perhaps 30 per cent. more train-miles.—EDITOR RAILROAD GAZETTE.]

The Limit of Workable Curvature.

NAPANEE Ont., April 6, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with great interest your articles on "Light Rails" in your issue of March 13, and again on "Light Railroads" in your issue of March 27. In the main I heartily indorse what is therein stated. The only point on which I wish to take issue is on the *sharpest* curve that will permit the passing of a locomotive of the ordinary type. It is stated on page 200, in your issue of March 27, that "Another curve of 50 ft. radius was used on the main line of the United States Military Railroad, at Petersburg, Va., standard gauge, over which 'a very large traffic (hauled by locomotives of ordinary type) passed for months afterward, supplying the armies about Richmond and other points to the southwest, and no accident or trouble whatever was experienced at the point in question.'" When a statement like the above is quoted in a journal of the standing of the *Railroad Gazette*, it is apt to be taken without further question. I have had considerable experience with very sharp curves. Some years ago it became my duty to lay out



COUPLING-ROD AND CRANK-PINS FOR PASSENGER ENGINES: CHESAPEAKE & OHIO RAILWAY.

a yard at the extensive lumber mills of the Rathbun Co., of Deseronto, Ont., and owing to the very limited room available the sharpest workable curvature had to be used. Seeing the above quoted extract in "The Railway Engineer's Practice," by Thomas M. Cleeman, A. M., C. E., I put in several curves of that radius, others of 57 ft. radius, about a dozen of 60 ft. radius, one of 79 ft. radius, one of 100 ft. radius, and one of 85 ft. radius. We were using a Baldwin "motor," which readily traversed all of them. We tried to place ordinary standard cars, box and flat, between the lumber piles, but they would not pass any curve of a less radius than 60 ft. I then tried a locomotive, not of the *standard type*, but smaller, such as are in use on the Elevated roads in New York, but it would not pass any curve of a less radius than 85 ft. The gauge was widened on all these curves ¾ in. My experience with these sharp curves would go to show that for an ordinary standard type of engine, 7 ft. 6 in. rigid wheel-base, with four-wheeled trucks in front, four drivers, two on each side connected, the sharpest curve workable is one of 208 ft. radius, and then the gauge must be widened fully 1 in. M. J. BUTLER.

[In the account of the operation of the above-mentioned curve on the Military Railroad, it was stated that passing around the curve at a very slow speed involved some difficulty, but that at higher speeds the difficulty vanished. Of course the use of such sharp curves as any of those referred to above is never expedient if avoidable, but as respects mere physical possibility, our correspondent seems to have fixed the limit considerably too high, and his difficulties must have arisen from special causes, perhaps merely from too slow speed, which there is great reason to believe materially increases curve resistance, although the fact cannot be said to be positively known. Thus, a heavy traffic in ordinary freight cars is handled by horses from the down-town New York freight stations over curves of considerably less than 60 ft. radius, some of them apparently of about 40 ft. radius. Street cars have usually 6 ft. wheel-base and freight cars only 5 ft., so that no reason is apparent why the last should not go wherever the first do, so far as curves are concerned, nor are we aware that any difficulty has ever been found in so doing. The outside rail, however, is in such cases, it should be noted, a flat grooved rail, permitting the wheel to run upon its flange, but this was not the case with the military railroad curve referred to.

As for locomotives, the perfect ease with which the four-car trains of the elevated railroads are handled on curves of 90 ft. radius makes it seem improbable that 85 ft. is the minimum possible limit for the engines although we cannot prove the contrary, and as for "engines of ordinary type," by referring to page 13 of the ninth (1876) report of the Master Mechanics' Association, our correspondent will find a map of a Y of 136 ft. radius around which heavy consolidation locomotives with *eight* drivers, *four* on a side, are (or were) "run without trouble." On the 4 per cent. grades of the Mexican Railway, reversed curves of 150 ft. radius on temporary track around tunnels were operated by ordinary locomotives for a year or more at its first opening, and other instances might, no doubt, be adduced, besides the undoubted one of the military instance refered to.—EDITOR RAILROAD GAZETTE.]

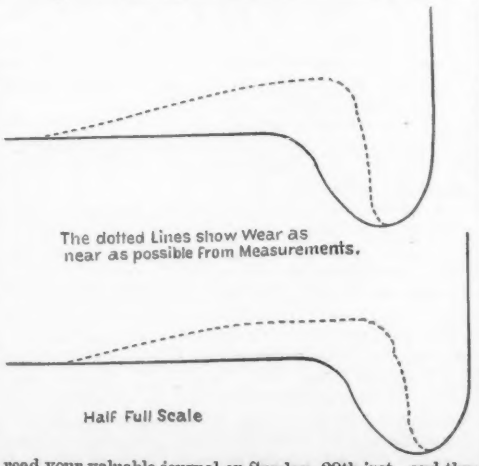
Two Sharp Flanges on One Axle.

Pennsylvania Railroad Co.,
MEADOWS, N. J., March 31, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your valuable journal of the 27th inst. "C. E." states that "it is practically an invariable rule that only one wheel on an axle has a sharp flange." He also quotes Mr. Richard Williams, an English visitor to the Master Car-Builders' convention in 1883, as saying: "I defy any of you to say you ever saw two sharp flanges on the same axle."

In the year 1884, as wheel-inspector at Meadows [on the Pennsylvania Railroad] I inspected over 27,000 wheels, and by referring to records of inspections of that year I find that two sharp or worn flanges on the same axle are very common.



I read your valuable journal on Sunday, 29th inst., and thus had my attention called to sharp flanges. On Monday following I inspected 70 pairs of old wheels, and found two cases of two sharp flanges on the same axle, to which I called the attention of my superiors and made a rough sketch of, which I append. R. H. FOWLE.

[We reproduce the sections inclosed precisely as received, simply reducing them one-half photographically, without attempting the modification which the rough sketches appear to need. We may properly note that in "C. E.'s" letter an exception was made in favor of wheels which had sustained full normal mileage. If any one will forward us mileage records and accurate sections of wheels removed, in pairs or otherwise, for sharp flanges, they will make a valuable contribution to the intelligent discussion of the question, which we shall be pleased to publish.—EDITOR RAILROAD GAZETTE.]

Coupling-Rod, Chesapeake & Ohio Railway.

The accompanying illustration represents a coupling-rod lately introduced on the above road, and used in passenger service. Mr. E. L. Chapman, the Superintendent of Motive Power, found that steel side-rods of rectangular section frequently break near the centre when employed on passenger service, though similar rods on sister engines in freight service stand well.

This seemed to prove that high speed and not heavy service was the cause of failure, the rods breaking from their own weight when the motion is continually reversed up and down when running. The remedy is, obviously, to lighten the rod and make it stronger against a cross breaking strain. These conditions are fulfilled by the I-section rod, so successfully used on the Pennsylvania and other roads, and consequently a steel I-section rod, as shown, was adopted by Mr. Chapman, and is running with very satisfactory results in passenger service. The brass bushes are secured in place by an oil cup screwed through the eye of the rod into the bush. A sort of oil cellar, fitted up with a syphon pressed upward against the pin by a light spiral spring, is also used. This serves to catch the oil which might otherwise be thrown off, and returns it to the pin by means of the worsted syphon.

Master Mechanics' Association Circulars.

The following circulars of inquiry have been issued by committees of this association:

LOCOMOTIVE IMPROVEMENTS.

Your Committee, to whom was referred the subject of "New Plans of Construction and Improvement of the Locomotive," respectfully request your co-operation in furnishing to them any information you may have bearing on this subject, in the line of the following questions, viz.:

1. Have you made any improvement in locomotive boilers or fire boxes?
2. Have you designed any new plans or built any locomotives other than what are now considered as standard? Please furnish tracings of same.
3. Have you made any improvement in the manner of

lagging locomotive boilers, or the covering of any parts heretofore exposed? Please furnish details of same.

4. Have you made any changes or improvement in locomotive frame pedestal, braces, etc.? Please furnish detailed plan of same.

5. Have you effected any improvement in the construction of engine and tender trucks? Please furnish tracing, showing details of same.

6. Have you made any changes in plan of making crossheads, tending toward improvement of same?

7. Have you made any improvement in manner of supporting and securing the boiler to the frame of the locomotive, other than the usual pads or braces? Please furnish tracing showing details of same.

The committee will be pleased to receive photographs, tracings or blue prints of any improvements you have made or have knowledge of that may be of interest and benefit to the association.

Very respectfully,
WM. WOODCOCK,
G. W. STEVENS, } *Committee.*
A. W. SULLIVAN,

Please send your replies, prior to April 15, 1885, to Wm. Woodcock, Master Mechanic Central Railroad of New Jersey, Elizabeth, N. J.

MATERIAL FOR LOCOMOTIVE BEARINGS.

Your Committee on "Best Metals for Locomotive Bearings," solicit answers to the following questions:

1. What has been your experience with metals used on engine and tender journal bearings? Also on connecting-rods and other parts of the locomotive?

2. Have you used journals lined with lead or any other soft metal? If so, with what results?

Please give composition other than lead. Also sketch, showing shape and dimensions of bearing; number of square inches of bearing surface; weight carried on journal and kind of lubricant used.

Give weight of bearing when first put in, and loss of weight to each 1,000 miles run. Also length and diameter of journal and loss in diameter from wear.

3. Have you knowledge of any composition that answers the same purpose as Babbitt metal in connecting-rods, etc., that requires a higher degree of heat to melt from friction, than Babbitt? If so, please give composition.

4. What kind of metal, in your experience, has given the best results for driving shaft, engine truck and tender journal bearings? If an alloy, please give composition, dimension and shape of same. Also method of fitting bearings in cast-iron box or shell.

5. Have you found the inserting of "Babbitt metal" in journals an advantage? If so, to what extent? Please explain method of inserting.

6. What metal have you found to give the best results for connecting and parallel rod bearings? What advantage, if any, is there in a solid bushing instead of the square bearing fitted in straps? Is "Babbitt" a benefit or otherwise in connecting rods, and how should it be inserted?

In answering the above, please do not confine yourself to the questions, but give any information that may be of interest or throw light on the subject. Send sketches or blue prints of bearings and boxes found to have given good results, and the weight carried on them.

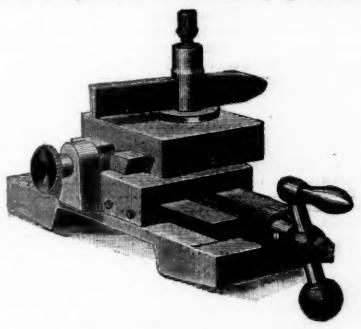
Send replies to Jas. M. Boon, Frankfort, N. Y., before April 15, 1885.

J. M. BOON,
J. S. GRAHAM, } *Committee.*
J. P. HOVEY,

Emery Wheel Tool Grinder

The accompanying illustrations represent a form of tool-grinder manufactured by the Springfield Glue & Emery Wheel Co., of Springfield, Mass. The emery wheel is surrounded by a hood which prevents the water used flying about the shop. An opening in front gives access for grinding. A cast-iron tank underneath catches the drip, and is so arranged that it can be easily cleaned of the iron and steel ground off the tools operated on. A centrifugal pump is connected with the tank by a pipe and coupling, in order to supply the wheel with plenty of water and use the water over and over. As the water is taken from nearly the top of the tank, the grit and dirt settle to the bottom out of the way.

It is stated that the use of water on an emery wheel prevents glazing, so that the wheel can be made harder and more durable than if it were to be used dry. Water also prevents heating and drawing the temper of the tools. The makers affirm that this machine possesses the following advantages as compared with an ordinary grindstone when



Slide Rest for Emery Wheel Tool-Grinder.

used for the same purpose, viz., grinding machinists' tools:

It occupies less room.

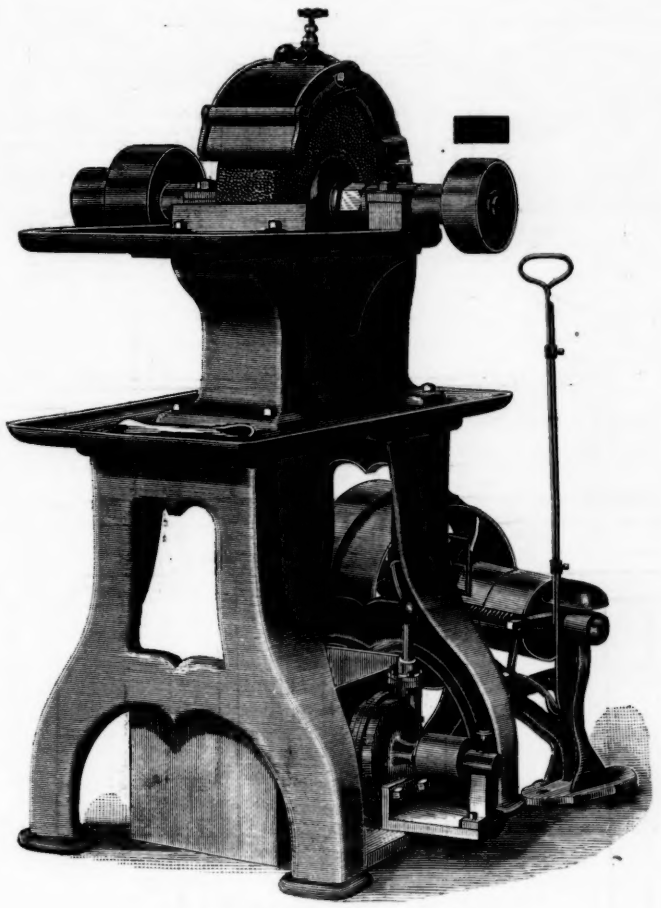
It is conveniently arranged, so that workmen can stand close to the wheel, and see how they are grinding, and do better work.

The grade, coarseness of grit and any degree of hardness can always be duplicated, while two grindstones are seldom alike.

The particles composing the emery wheel are sharp, instead of smooth and egg-shaped.

The grains of a grindstone placed on platform scales crush at 5 to 7 lbs. pressure, while grains of emery of equal size crush at 25 to 35 lbs. pressure, and therefore the emery, being very hard, will not wear away as fast, and will make less dirt.

The wheel is five times as strong, and will therefore stand running five times as fast, and thus give five times as much



EMERY WHEEL TOOL-GRINDER.

Made by the SPRINGFIELD GLUE AND EMERY WHEEL CO.

cutting surface per minute, and will grind correspondingly faster.

Thus a grindstone composed of soft, round-shaped particles, 3 ft. in diameter, running an average speed of 70 revolutions, gives 659 ft. of grinding surface per minute, while an emery wheel (composed of the hardest known rock with sharp cutting corners) 2 ft. in diameter runs 550 revolutions, giving a grinding surface of 3,460 ft. per minute.

As a machinist spends on the average at least half an hour daily in keeping his tools sharp, the time thus lost has a considerable money value in a shop of any size. Taking a shop with 40 machinists, and reckoning their pay at 20 cents an hour, the time occupied in grinding costs $1,200 per annum, which is quite a respectable sum. A reduction of even 25 per cent. on this amount is worth having.

Waste in the Workshop.

One of the most common sources of expense in an industrial business, and one most generally neglected, is waste in the workshop among the employés. Although the amount in each particular case is small, yet in the aggregate it becomes an expensive item. In some shops the quantity of small articles, such as screws, nails, panel pins, washers, etc., that may be seen lying upon the floor, is astonishing. There seems to be no idea of their value, either by the workmen or foreman. If a man drops such a slight article he will not take the trouble to pick it up, and the result is that the ground is littered with them, they soon become covered with shavings, sawdust and rubbish, and are thrown away by the sweeper. Even if he picks up one-half of what is dropped they become of very little use, nails and screws of all kinds and sizes being mixed up together. A man cannot stoop down every time he drops a small article, but he might take that trouble occasionally, and put it back in its proper place. As it is, whatever is once dropped may be considered lost. This looseness leads to another and greater evil, peculation and petty theft. A man, seeing these things treated as of no value, says to himself as he picks them up and puts them in his pocket, "These nails will come in useful to make that fence or fowl-house in my garden," or "These screws will just do for the box I am going to make for my wife at home." In fact, the men almost look upon them as a kind of perquisite, to supply themselves. Even such comparatively large articles as bolts, nuts, and rivets are often seen strewn about the ground, especially out of doors, where they get trodden into the earth. The amount of old iron, etc., that is shot out at the heaps or tips of rubbish would well pay the employer to keep a man to look them over.

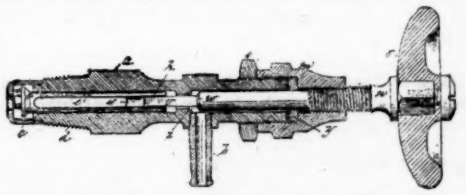
The same waste often takes place where good-sized pieces of expensive wood, such as mahogany, etc., too small to be utilized on the premises, are cut up for firewood, instead of being sold to makers of small articles, fancy goods or others. The brass dust and filings made by the fitters are collected in trays fixed to the vises in some establishments, but are swept up with the dirt and wasted in others. Oil is often allowed to drip and fall from the shafting pedestals upon the floor, making everything about them greasy and dirty, but if caught in tin dishes suspended beneath may be used again. Extravagance in gas requires checking in some factories where it is allowed to flare away at full pressure all over the place without any control. If a man leaves his work for an hour or two he does not think to turn down his gas, but allows it to burn all the time. In a better regulated shop the burners are of the duplex or some other economical kind, pressure regulators being fixed upon the various branch pipes to control the consumption, which often varies very much at different times as some divisions are turned off or put on. The waste in this item alone in a large manufactory with some hundreds of jets burning every day would, if carefully examined into, be found rather startling.

A difference may be often noticed between a loose and thrifty system of using stationery. The waste paper, such as envelopes, etc., is in some places thrown away or burnt, whilst the clerks think nothing of taking a new sheet of writing or foolscap paper, or a memorandum form, to work out their calculations. In others, the envelopes, fly leaves of letters, etc., are set aside, not only for this purpose, but are utilized, as are the backs of useless vouchers, invoices, etc., by printing on them and using them about the premises for instructions to foremen, reports, etc., being as good as new for such purposes. In some drawing offices a large amount of tracing paper and cloth is wasted. Some draughtsmen cut their paper recklessly, leaving 5 or 6 in. margin, which has to be cut off ultimately, or will put the roll of paper back in a dirty drawer, or on a dirty table, thus making a soiled mark along the underside of the roll, which must be cut off by the next user, thus involving another waste of 6 or 7 in. Scores of such instances of unnecessary waste must occur to any one conversant with workshop practice. The greatest cause is carelessness among employés and want of sufficient supervision. It is their employer's material and not theirs, and so they do not trouble themselves to economize unless compelled to. The same men when they are at home are most careful of their own coal or gas, and if they are doing any little carpentering job of their own, will drop on their knees and search for every nail in the most careful manner; then why not be taught to do so for their masters? A careful and intelligent foreman soon saves the amount of his wages by a systematic encouragement of thrift and a condemnation of those men who are the greatest offenders. A few words will generally suffice to put a check on the practices, whilst making an example by discharging a few men will have a wholesome effect upon the rest.—*Mechanical World.*

Self-Cleansing Locomotive Gauge Cock.

The accompanying illustration represents an improved form of gauge cock lately patented by Mr. W. E. Granger, of Springfield, Mass.

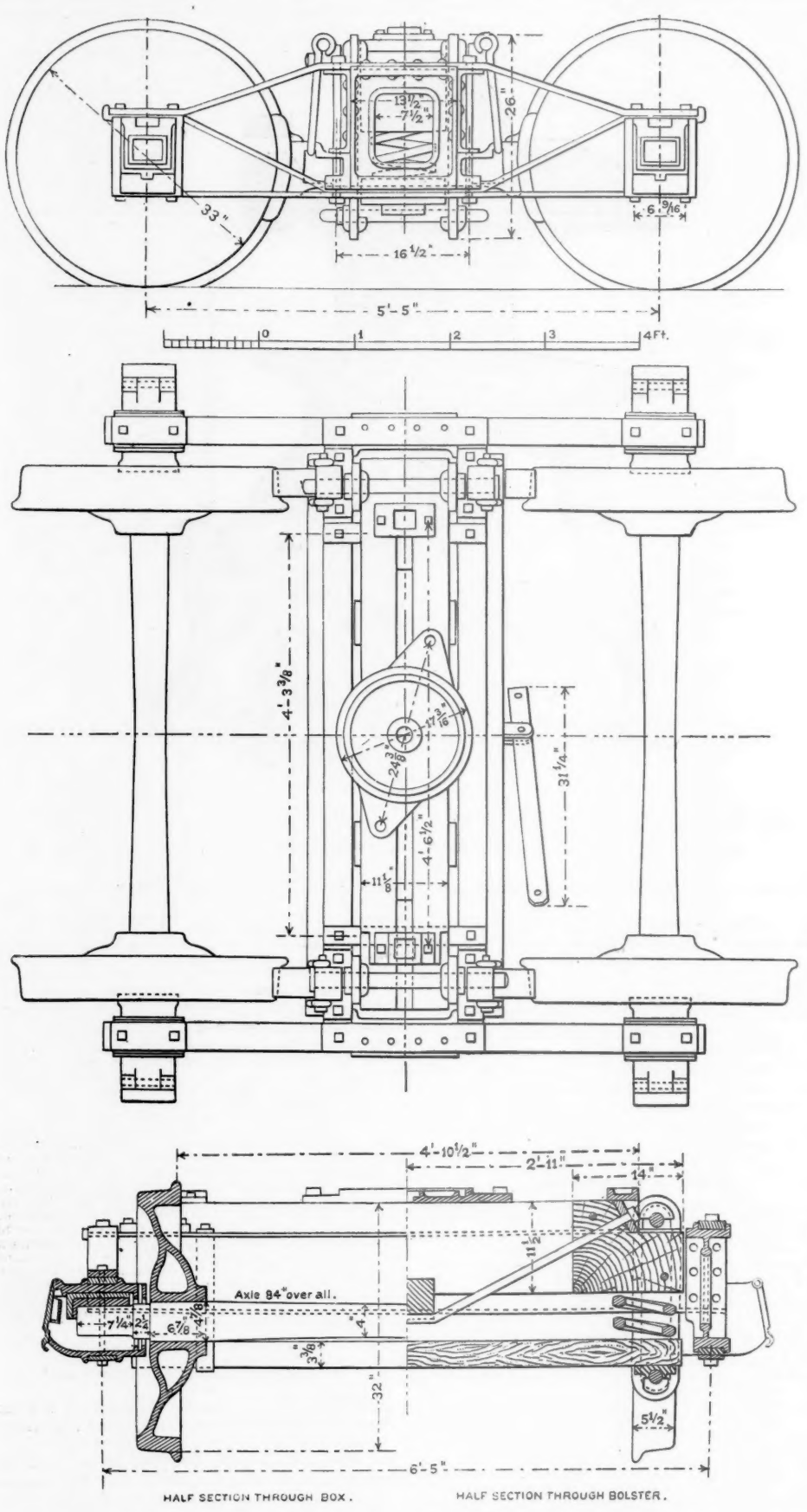
The object of the invention is to keep the valve chamber free of sediment, for which purpose the valve is disconnected with the valve stem, but is rotated each time it is open or



Self-Cleansing Locomotive Gauge Cock.

shut. The valve stem has a squared end, *v*, which ends in a corresponding recess in the valve, and while permitting an independent longitudinal motion, the valve can be rotated by means of the squared end *v*. The valve has a slot, *e'*, cut through it, so that when the valve is forced off its seat, *e*, the water or steam can escape. In case the valve should stick, and the pressure of the steam is insufficient to seat it, the valve stem may be screwed down, and a tight point made on the seat *w*. The inventor claims that the valve being rotated each time it is used, the passages will be kept clear, the edges of the slot cutting away any sediment or incrustation.

As the valve is closed by the pressure of the steam, it may reasonably be expected to act as a safety gauge cock, should that part of the valve outside the boiler be broken off in a



STANDARD FREIGHT CAR TRUCK, RICHMOND & DANVILLE RAILROAD.

collision or other accident. Other forms of gauge cocks possessing a self-closing device in case of accident have been lately illustrated in these pages.*

Standard Freight Car Truck, Richmond & Danville Railroad.

The accompanying illustrations represent the standard truck used under all freight cars and tenders on this road. As will be seen, it is constructed more carefully than the great majority of trucks. The transoms are of channel iron, and are secured to one another and to the diamond frame by a casting, two faces of which (butting against the transoms) are planed, and the holes for the six rivets drilled simultaneously by a special machine. The other faces butting against the arch-bars are cast in a chill, and the holes cored. The swing links, as will be seen from the drawing, have large wearing pieces, the upper ones carrying also the brake hangers. The bolster is made in two flitches, with distance pieces at the ends, and the truss-rod passes between the flitches. The lower swing-hanger pivots are made of extra length, so as to catch the brake-beam, should the hangers give way.

Muley axles are used, the end-thrust being taken by a piece of brass with two rivets cast on, and riveted to a piece of bar-iron 4 in. by ¼ in. section. This bar is bent at right angles, as shown in the drawing, and the external angle at the bend bears against a lug cast on the box. This takes any end-thrust, and it is further assisted by the weight of the car, which rests on the horizontal part of the wrought-iron bar.

*See *Railroad Gazette*, Oct. 3, 1884, page 715, and Nov. 14, 1884, page 813.

The Chestnut Street Bridge Foundation.

The last meeting of the Engineers' Club of Philadelphia, on March 21, was chiefly devoted to renewed discussion of this question. Mr. J. M. Titlow submitted various answers to the criticisms which have been offered, discussing the interpretation to be put on the defects which have appeared and controverting certain assertions of fact which have been made, but containing no other new matter likely to throw light upon the question.

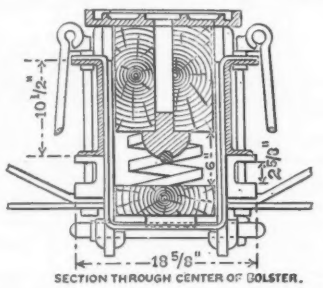
Prof. L. M. Haupt called attention to a communication from Mr. S. Haslett in the *Railroad Gazette* of Feb. 20, 1885, supporting his view that the defect of the bridge was in the west abutment and due to the weight of the filling and defective foundation. He also read a communication from himself to the *Engineering News* of March 11, 1885, to the same effect.

Mr. Rudolph Hering, from his own measurements and studies some years ago, presented a careful statement of his views and the reasons therefor, recapitulated as follows:

"*First.*—That the west abutment, which has recently been braced by concrete cylinders, has moved very slightly, if at all, being the only part of the bridge on the west side of the river, which is plumb, which has not settled and shows no cracks.

"*Second.*—That the horizontal timber struts put in under the brick arches, if they show, at present, any compression at all, are compressed rather by an *eastward* movement of the west abutment, than by a *westward* movement of the abutment pier.

"*Third.*—That the deformation of the brick arches is



SECTION THROUGH CENTER OF BOLSTER.

partially accounted for by an unequal loading of the haunches, due to the heavy grade of the bridge.

"*Fourth.*—That the greater deformation of the western-most arch is caused by the eastward movement of the west abutment, which appears to be the main cause of trouble, but for which avowedly no remedy has as yet been applied."

The substance of all the recent discussions which have appeared seems calculated to strengthen the doubts as to the adequacy of the recent repairs to cure the defects which have appeared.

ANNUAL REPORTS.

The following is an index to the annual reports which have been reviewed in previous numbers of the current volume of the *Railroad Gazette*:

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Chicago, Burlington & Quincy.

At the close of its last fiscal year, Dec. 31, the road operated by this company was as follows:

	1884.	1883.
Roads owned and leased, miles	3,369.084	3,224.214
Roads leased and worked jointly and roads for which a fixed yearly rental is paid	98.293	98.293
Total	3,467.377	3,322,507

The increase during the year was by the building of 144.870 miles of new branches in Nebraska and Kansas. These lines are described below.

The equipment includes 587 locomotives; 271 passenger, 1 stateroom, 5 dining and 109 baggage, mail and express cars; 15,635 box and stock, 4,565 flat and coal, and 277 caboose cars; 9 officers' and pay cars, and 28 road or service cars; 1,022 hand and 725 rubble and iron cars.

Additions last year were 45 locomotives; 18 passenger and 12 baggage cars; 1,140 box, 200 coal and 16 caboose cars; 3 service cars; 60 hand and 52 rubble cars.

The general account, condensed, is as follows:

Liabilities.

Capital stock	$76 450,146
Funded debt	71,144,608
Contingent liabilities, bonds of branch lines	6,016 000
Accounts and balances payable	1,178 251
Profit and loss	5,913.903
Renewal fund	7.000,000
Income account, balance	10,876.920
Sinking funds	9,189.464
Total liabilities	$187,769,292

Assets.

Construction and equipment		$103,665,581
Cost of branch roads		38,211.278
Cost of securities held to protect lessees, etc		148.911
Investments in allied and controlled lines		25,725,089
Sundry investments		411,036
Materials on hand		1 8 7.568
Sinking funds		7,088,848
Sundry available securities	$2,456,714	
Bills and accounts receivable	4,578,635	
Cash in treasury	3.675,432	
		10,710,781
Total assets		$187,769,29

The stock includes $71,007 Burlington & Missouri River (Iowa) stock still outstanding, and $40 fractional stock scrip.

Stock was increased by $2,900 issued in exchange for Burlington & Missouri River (Iowa) stock and $4,506,400 sold to stockholders under circular of April 7. In addition to that stock there were sold to stockholders $2,382,000 reported last year as held in the treasury.

The only issue of bonds made was $8,800 Burlington & Missouri River in Nebraska consols exchanged for branch bonds. There were retired $50,000 branch bonds and $183 bond scrip paid and canceled · $196,000 Iowa Division 4s bought for sinking fund; $2,500 Burlington & Missouri River convertible bonds exchanged for stock and $8,000 branch bonds exchanged for consols. The net reduction of funded debt was thus $247,883.

A condensed view of the financial condition of the company is as follows:

Permanent investment in construction		$141,876,859
Materials on hand		1,807,567
Sinking funds		7,088,848
Investments in other roads etc		26,136,325
Securities, accounts receivable and cash		9,664,822
Total assets		$186,574,421
Capital stock	$76,450,146	
Bonds of all issues	77,160,608	
		153,610,754
Excess of assets over stock and bonds		$32,963,667

In the bonds above are included the bond issues on branch roads for which the company is liable.

The only statement of traffic given is as follows:

	1884.	1883.	Inc. or Dec.	P.c.
Passengers carried	4,519,185	4,123,638	I. 395,547	9 6
Tons freight carried	7,525,997	7,645,601	D. 119,704	1.6

Passengers do not include those carried on mileage or season tickets. The tonnage includes Illinois freight in cars of that road—261,910 tons in 1884, and 368,955 in 1883.

The earnings for the year were:

	1884.	1883.	Inc. or Dec.	P.c.
Freight	$18,514 431	$19 574,161	D. $999,730	5.1
Passengers	5,359,866	5,285,839	I. 54,027	1.0
Mail, etc	1.6 9,315	1,310,369	I. 318,946	24.3
Total	$25,483,612	$26,110,369	D. $326,757	2.4
Expenses	14,090,746	13,496,478	I. 594,268	4.4
Net earnings	$11,392,866	$12,613,891	D. $1,221,025	9.7
Gross earn. per m.	7,497	8,023	D. 526	6.5
Net earn. per m.	3,352	3,876	D. 524	13.5
Per cent. of exps.	55.3	51.7	I. 3.6	....

Taxes are included in expenses. The average mileage worked for the year was 3,399 miles, against 3,255 in 1883. The taxes on all the lines last year amounted to $1,018,242, being 7.2 per cent. of the total expenses, or 4 per cent. of gross earnings.

The income account, condensed, is as follows:

Net earnings, as above		$11,392,866
Interest, exchange, etc		566,770
Total		$11,959,636
Rent of tracks and depots	$139,604	
Interest on bonds	4,304,281	
Payments to sinking funds	938,965	
Dividends, 8 per cent	5,566,580	
Appropriated to renewal fund	500,000	
		11,448,530
Surplus for the year		$511 106
Net receipts, Land Dep't in Nebraska		1,129,591
Balance from 1883		9,236.223
Total surplus, Dec. 31, 1884		$10,876.920

The amount carried to renewal fund in 1883 was $1,500,000, and in 1882 it was $1,000,000.

Expenditures on construction account during the year were:

New second track and other improvements, Illinois		$702,630
" " " " St. L., K. & Chi.		1.389
" " " " Iowa		555,317
" " " " Nebraska		256,044
Construction of new lines, Iowa		31,119
" " " Nebraska		2,508,552
New telegraph lines		9,309
Total		$4,064,360
Less credits, discount, etc		16,407
Total construction		$4,047,953
New equipment added		1,098,995
Total		$5.146,948

The total new road built was 144.9 miles, as noted below in detail.

LAND DEPARTMENT.

In Iowa the land grant amounted to 358,424 acres, of which 339,272 acres have been sold at an average of $12.15 per acre. Net sales for 1884 were 2,022 acres for $17,471. The cash receipts in 1884 were $359,305; the expenses, $20,806, leaving a net balance of $338,499. There are on hand 19,152 acres unsold, and land contracts amounting to $757,916.

The land grant in Nebraska was 2,365,864 acres, of which 2,237,004 acres have been sold at an average of $6.35 per acre. Net sales for 1884 were 53,555 acres for $341,250. Cash receipts in 1884 were $1,186,335; expenses, $56,744, leaving $1,129,591 net. The assets include 128,860 acres unsold, and land contracts amounting to $3,059,420 principal value.

CONDITION OF ROAD.

The report says: "During the year 30¼ miles of second track have been added in Illinois, 18¼ in Iowa and 3¼ in Nebraska. The number of miles of second track on Dec. 31, 1884, was: In Illinois, 168½; in Iowa, 43, and in Nebraska, 3¼.

"In Illinois and Iowa during the year 73 miles of steel rails were laid in branches and side tracks to replace iron rails, 48½ miles of steel rails were laid in new second tracks and 15¾ miles in new side tracks. The total number of miles of steel rails in all tracks east of the Missouri River on Dec. 31, 1884, was 1,453¼. This includes the whole main line in Illinois and Iowa.

"In Nebraska and Kansas during the year 42½ miles of main line track and ½ mile of side track were relaid with steel rails in place of iron rails; 109 miles of steel rails were laid in new main track upon the lines from Holdredge to Oxford, Aurora to Grand Island, and Odell to Concordia; 3¼ miles in new second track, and 1½ miles in new side tracks, making the number of miles of steel rails in all tracks west of the Missouri River on December 31, 1884, 731¼.

"The general condition of the entire road and equipment has been fully maintained during the year.

NEW LINES.

"During the year new roads and extensions have been built, in whole or in part, as follows:

"In Iowa, the Western Iowa road, from Fontanelle west to Cumberland, about 23 miles, begun in November, 1884, will be completed in 1885.

"In Nebraska, a branch of the Nebraska & Colorado road from Chester north to Hebron was completed and opened for business Jan. 3, 1884, 12 miles. The Nebraska & Colorado from DeWitt west to Tobias, completed and opened for business May 1, 1884, 23¾ miles. An extension of the Kenesaw Branch of the Nebraska & Colorado, from Holdredge southwest to Oxford, completed and opened for business Aug. 4, 1884, 20¼ miles. The construction of this road shortens our line, between the Missouri River and Denver, 28 miles.

"A branch of the Republican Valley road from Aurora west to Grand Island, completed and opened for business June 8, 1884, 18½ miles.

"The Chicago, Nebraska & Kansas road, from Odell southwest to Concordia, completed and opened for business Aug. 25, 1884, 70¼ miles.

"We are still compelled to postpone the construction of the coal road in Colorado, on account of the unsettled state of the coal problem there.

GENERAL REMARKS.

"The actual length of the road in operation Dec. 31, 1884, was 3,467.4 miles, against 3,322.5 miles Dec. 31, 1883, an increase of 144.9 miles.

"The properties controlled by this company, whose operations are not embraced in this report, show a falling off in net surplus for the year of about $300,000, having earned about $700,000 in 1884, as against $1,000,000 in 1883, after paying their own operating expenses and interest on their outstanding liabilities not owned by the Chicago, Burlington & Quincy Co. The Kansas City, St. Joseph & Council Bluffs Co. paid during the year dividends amounting to 5 per cent. on its capital stock, yielding to this company the sum of $263,040.

"The decrease in earnings in 1884 was due to increasing competition and a falling off of business, the actual tons moved having been 119,703 less than in 1883, in spite of an increase of 144 miles in the average length of road operated. The increase in the ratio of expenses to earnings is due in part to the same causes—lower rates and a less volume of business—and in part to the fact that, owing to a change in the law regulating the collection of taxes in Nebraska, we paid in 1884 the taxes for 1883 and also for 1884, the amount for the latter year having been about $300,000, which under the old law would not have been payable till May, 1885.

"The falling off of business in 1884 is to be attributed to the dullness of trade generally."

Mexican Central.

The report of this company for the year ending Dec. 31 last shows a total mileage of 1,354.1 miles at the end of the year.

The general account, condensed, is as follows:

Liabilities:	
Stock outstanding	$31,362,900
Income bonds	7,641,000
First-mortgage bonds	36,874,000
Coupon notes and scrip	3,678,255
Loan subscription of Jan. 24, 1884	1,090,000
Notes and floating liabilities	1,739,892
Subsidy earned	15,727,603
State subsidy account	279,948
Subsidy revenue	2,7 4,960
Income	156,255
Total liabilities	$101,274,813
Assets:	
Road and equipment	$83,133,164
Other property	746,004
Materials	1.060,541
Due on subsidy certificates	9.878,'04
Subsidy received	5.849.299
Cash and cash assets	607,501
Total assets	$101,174,813

The above does not include $1,635,000 stock, $545,000 income bonds and $5,976,000 first-mortgage bonds held by trustees and others as collateral.

The earnings for the year were:

	1884	1883.	Inc. or Dec.	P.c.
Freight	$1,709,380	$1,140,909	I. $628 471	55.1
Passengers	1,098,008	713,750	I. 384,258	53.8
Other	148,682	104,608	I. 44,674	42 0
Total commercial	$3,016 070	$1,959,267	I. $1,056,803	54 0
Company freight	726,151	1,624,148	D. 897.997	55.3
Total	$3,742,221	$3,583,415	I. $158,806	4 4
Expenses	2,419.457	1,988,048	I. 431,409	22 7
Net earnings	$1,322,764	$1,595,367	D. $272,603	17.1
Per cent. of exps.	64.6	55.5	I. 9.1	...

The earnings credited on company freight are the actual cost of hauling the same only.

The earnings above are in Mexican currency. Reduced to United States currency the net earnings last year were $1,150,230, against $1,416,904 in 1883.

A statement is also given, showing that in the last six months of 1884 the company earned $1,525,461 in United States currency; operating expenses were $1,182,918, and there remained Jan. 1, 1885, after paying miscellaneous expenses, a balance of $156,255. The earnings and expenses of the main line (1,236 miles) per mile, operated in those same six months, were:

	Mexican currency.	U. S. currency.
Earnings	$2,648	$2,302
Operating expenses	1,914	1,664
Net earnings	$734	$638

The earnings per revenue train-mile were $1.47 (U. S. currency); expenses, $0.98; net earnings, $0.49.

The directors' report says: "The main line, City of Mexico to El Paso, Texas, was completed and put into operation in April last, and has been recently inspected by the President and two of the directors. It is in good condition, and above the average of roads in the United States.

"Present mileage is as follows: City of Mexico to El Paso, 1,224.2; Guanajuato Branch, 11.4; branch to Stone Quarry, 6.5; Tampico Division, 96; San Blas Division, 16—total, 1,354.1 miles.

"*Tampico Division.*—At the date of the last report, the track was at kilometre 156, and will soon reach kilometre 163 east of Tampico, at which point it is hoped that sufficient business will be received to pay operating expenses.

"*Pacific Division.*—The directors are of opinion that it would be more profitable to the company, and better for the people of Mexico, to build from the main line to Guadalajara, than to continue building from San Blas. At present the expenses of this division are very light.

"*Equipment.*—The company's equipment, exclusive of road department cars, was on Dec. 31, 1884, as follows: Locomotives, 96; passenger equipment, 89 cars; freight equipment, 1,954 cars.

"*Subsidy.*—Subsidy certificates were received during the year to the amount of $2,550,000, and the amount of cash subsidy collected was $974,564, Mexican currency. The entire expense of collection, including local exchange, was $17,314. The company is now receiving 8 per cent. of the import duties, in accordance with the provisions of the concession. Up to Dec. 31, 1884, the company has received in cash from this source, net, $2,669,344, United States currency, and has paid out $2,790,535, in the same currency, for interest on the first-mortgage bonds.

"*Income.*—The actual income for the year from all sources was as follows:

Net earnings, U. S. currency	$1,150,229
Net subsidy collections, U. S. currency	847,447
Total	$1,997,676

"But, as intimated in the annual report for last year, July 1, 1884, was fixed as the date when the main line ceased to be operated for account of structure, and all interest paid and all net earnings received prior to that date have been closed into the construction account; the general income of the company dates from July 1, 1884.

"*Financial condition.*—At the present time, coupons Nos. 6, 7 and 8, from $36,062,000 of the first-mortgage bonds, amounting to $3,786,510, have been funded, and coupon notes and scrip for that amount issued in accordance with the terms of the circular of June 16, 1884, leaving the coupons on $512,000 of first-mortgage bonds, amounting to $53,760, not yet exchanged.

"The trust notes given for the loan of Jan. 24, 1884, and all floating indebtedness, have been paid by the proceeds of the subscription under circular No. 5. The company has no floating debt. The debentures issued under circular No. 5 are limited to $2,500,000.

"*In general.*—At the time of the last annual meeting, Mr. Thomas Nickerson, who has served the road as President since May 14, 1880, intimated his desire to be relieved, on account of his advancing age and the condition of his health, and his resignation was accepted, to take effect Aug. 4, 1884. Mr. Isaac T. Burr served as temporary President until Oct. 11, when a permanent election was made. The General Manager, Mr. D. B. Robinson, and his staff have thoroughly organized the several departments, and are administering the property economically and effectively. The local traffic is increasing, and there are indications that the development of the great natural resources of the country through which the line passes has begun. The confidence of the directors in the stability and fairness of the Mexican government and in the safety and ultimate success of your investments are increased."

Richmond & Alleghany.

This company owns a line from Richmond, Va., through Lynchburg to Clifton Forge, 230.30 miles, with the Dock Connection in Richmond, 1.24 miles, and a branch from Balcony Falls to Lexington, 20 miles, making 251.54 miles in all. It leases the Henrico road, from Lorraine to Hungary, 11 miles, making 262.54 miles worked. The road is built on the line of the old James River & Kanawha Canal, which was bought by this company.

The road is in the hands of Lawrence Myers and Decatur Axtell, Receivers in suits pending for foreclosure, and they have made a very full report for the year ending Sept. 30 last.

The equipment includes 19 locomotives; 16 passenger, 2 observation, 3 sleeping and 10 baggage cars; 273 box, 48 stock, 412 flat, 12 gondola, 50 coal and 10 caboose cars; 3 service cars.

The general account, condensed, is as follows:

Stock		$5,000,000
Funded debt		7,994,000
Car trusts		416 000
Receivers' certificates		149.000
Bills payable and sundry liabilities		903,837
Interest on bonds		9'9,595
Profit and loss		254,116
Total		$15,676,548
Road and property	$14,407,091	
Stocks and bonds	212,800	
Materials	34,262	
Cash and accounts receivable	62,800	
Interest on bonds	959,595	
		15,676 548

The stock is $19,878 and the bonds $31,780 per mile of road owned; car trusts and receivers' certificates are $2,246 per mile more.

The traffic for the year was as follows:

	Passenger.	Freight.
Train miles	270,189	258,373
Car miles	1,069,890	3,082,623
Passengers or tons carried	148,528	305 157
Passenger or ton-miles	5,592,373	24,549,022
Average train load	21	95
Average rate	2.86 cts.	1.434 cts.

Of the freight car mileage 28.3 per cent was of empty cars. The total locomotive mileage was 666,641; the cost 13 cents per mile run. The freight tonnage includes 1,822,390 ton-miles of company freight. The average rate east-bound was 1.207; west-bound, 2.007 cents per ton-mile. The express business included 1,045 tons carried 89,753 miles at an average rate of 24.446 cents per ton mile. The average rate for regular passengers was 3.33; mileage tickets, 2.28; excursion, 0.93 cent per passenger mile.

The earnings for the year were:

	1883-84.	1882-83.	Inc. or Dec.	P. c.
Freight	$331,650	$371,782	D. $40,132	10.8
Passage	160,150	153,792	I. 6.358	4.1
Mail and express	45 136	38,404	I. 6,732	17.5
Rents, etc.	67,147	71,349	D. 4,202	5.9
Total	$604,083	$635,327	D. $31,244	4.9
Expenses	420,104	406.900	I. 13,204	3.2
Net earnings	$183,979	$228,427	D. $44,448	19.5
Gross earn. per mile	2,301	2,420	D. 119	4.9
Net " "	701	870	D. 169	19.5
Per cent. of exps.	69.5	64.0	I. 5.5	...

The earnings of the railroad, excluding water power and dock rents, etc., were $541,521, or $2,063 per mile; its expenses were $395,543, and the net earnings $145,978, or $568 per mile. The net earnings last year were 2.3 per cent. on the funded debt.

Earnings were diminished by the depression in general business, especially affecting the iron and ore traffic and the business in lumber and coal. The expenses were increased by the freshet of March, 1884, which did much damage to roadbed and structures. The expense accounts are at all times complicated by the maintenance of the canal as a source of water-power, and the other collateral properties.

The income account was as follows:

Net earnings		$183,979
Receivership expenses	$14,000	
Taxes	33,674	
Interest, discount, rentals, etc	40,629	
		88,303
Balance to profit and loss		$95,676

Expenditures for construction last year were $176,507; for equipment, $3,997, making a total of $180,504.

The Receivers' report refers at much length to the improvements made on the road in renewal of structures, filling trestles, raising grade at exposed points, improving alignment and similar work, which has made the condition of the line very much better.

In order to comply with the conditions of water-power leases it is necessary to keep water in the canal for 70 miles between Richmond & Lynchburg and for 8 miles above Lynchburg. This requires the use of trestle work for the tracks at many points. The new dam at Lynchburg has been completed at a total cost of $120,000, much improving the water power there. The revenue from the collateral property, the water power and the Richmond docks, has been considerable, and the Receivers believe that this revenue will be hereafter a source of profit to the company.

The improvements needed on the road are further corrections of the alignment at several points, the filling of some 18,000 lineal feet of trestles and the building of a permanent track through Lynchburg in place of the present temporary line.

The Henrico Railroad was abandoned near the close of the year, in consequence of the suspension of mining by the Henrico Coal Co. A branch 4 miles long, from Bremo Bluff to slate quarries, is being built by the Buckingham Railroad Co., and will be ironed and operated by this company.

The company has now, for the first time, relations with connecting lines permitting a free interchange of through business at Clifton Forge, Lexington and Lynchburg.

RAILROAD GAZETTE

Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

COURSE OF EARNINGS OF CHICAGO RAILROADS.

Reports now made enable us to present together the gross and net earnings and working expenses of five of the six great Chicago railroads for the last calendar year—all but the Chicago, Rock Island & Pacific. Of the five, the Chicago & Alton has had no increase in mileage for some years; the Illinois Central has made small additions only (excluding the Southern lines which it had long controlled), while the other three have been making very great additions to their lines. But, as will be seen, the additions made last year were comparatively small. The mileage, gross and net earnings of each of the five in 1884 and 1883 compare as follows:

Miles.	C. M. & St. P.	C. & N. W.	C. B. & Q.	C. & A.	Ill. Cen.
1884	4,778	3,840	3,350	850	2,060
1883	4,565	3,644	3,255	850	1,988
Inc.	213	186	95	.....	72
Gross earn.					
1884	$23,470,998	$23,491,898	$25,483,671	$8,709,271	$12,190,883
1883	23,659,823	25,024,066	26,110,369	8,810,610	13,004,743
Dec.	$188,825	$1,532,168	$626,698	$101,336	$873,860
Per cent.	0.8	6.1	2.4	1.1	6.7
Expenses.					
1884	$13,859,628	$13,411,017	$13,008,563	$4,886,646	$6,128,511
1883	13,778,038	14,419,647	12,780,630	4,879,958	6,435,271
Dec.	.....	$1,008,630	.....	.....	$306,760
Inc.	$81,590	.....	$287,933	$6,688	.....
Per cent.	0.6	7.0	2.2	0.1	4.8
Net earn.					
1884	$9,611,370	$10,080,881	$12,415,103	$3,822,628	$6,062,372
1883	9,881,785	10,604,419	13,329,739	3,930,652	6,629,472
Dec.	$270,415	$523,538	$914,636	$108,024	$567,100
Per cent.	2.7	4.9	6.9	2.7	8.6

The gains in mileage last year were 3 per cent. by the Chicago, Burlington & Quincy, 3¾ by the Illinois Central, 4⅛ by the Chicago, Milwaukee & St. Paul, and 5½ by the Chicago & Northwestern.

It is noticeable that the earnings of the three largest systems are nearly equal, and that the one with smallest mileage has largest earnings. The Northwestern last year had 14½ per cent. more miles than the Burlington, but 8 per cent. less earnings; the Milwaukee & St. Paul 42¼ per cent. more miles and 8 per cent. less earnings. But we shall see their relative position better by comparing their earnings per mile, as follows:

Gross Earn.:	C. M. & St. P.	C. & N. W.	C. B. & Q.	C. & A.	Ill. Cen.
1884	$4,913	$6,118	$7,607	$10,249	$6,095
1883	5,201	6,867	8,028	10,368	6,776
Net Earn.:					
1884	2,012	2,625	3,706	4,498	3,031
1883	2,172	2,910	4,095	4,626	3,439

The Northwestern and the Illinois Central rank nearly together in gross earnings per mile, but the Illinois Central has nearly one-sixth more net earnings; the Milwaukee & St. Paul stands far below the others. Compared with its gross earnings per mile last year, the Illinois Central earned 24 per cent., the Northwestern 24½ per cent., the Burlington 55 per cent., and the Chicago & Alton 109 per cent. more. In net earnings the Northwestern had 30 per cent., the Illinois Central 50 per cent., the Burlington 85 per cent., and the Chicago & Alton 124 per cent. more.

The differences in traffic are greater than those in earnings, as the roads with the largest earnings have the lowest rates.

The rates of decrease in gross earnings from 1883 to 1884 varied from 0.8 per cent. by the Milwaukee & St. Paul to 6.1 on the Northwestern and 6.7 on the Illinois Central. The changes in mileage, however, naturally affect this considerably. In gross earnings per mile the rate of decrease was over 1.1 per cent. on the Chicago & Alton, and 5¼ per cent. on the Burlington, against 5¾ on the Milwaukee & St. Paul.

In total net earnings the rate of decrease was least on the Alton and the Milwaukee & St. Paul, and greatest on the Illinois Central. In net earnings per mile the Chicago & Alton's decrease of 2.7 per cent. was least, followed by the Milwaukee & St. Paul's 7.4 per cent., while the others lost 9½, 10 and 12 per cent.

Only the roads with a very large decrease in earnings—the Northwestern and the Illinois Central—had any decrease in expenses, and all had a decrease in net earnings.

The crops were partly favorable and partly unfavorable for the traffic of the Chicago railroads last year, the heavy wheat crop last year affording a large traffic in the last five months of the year, but the bad corn crop of 1883 keeping the receipts of grain small. In the aggregate, however, the total grain and flour receipts were slightly less in 1884 than in 1883, when they were nearly as large as they ever had been. The live stock receipts fell off in 1883. Evidently, however, the reduced earnings were not due to a decline in the traffic in farm produce, but chiefly to other causes.

In the aggregate, the mileage, earnings, etc., of these five roads for the last two years have been:

	1884.	1883.	Inc. or Dec.	P. c.
Miles	14,818	14,242	+ 576	4.0
Gross earn	$93,346,724	$96,669,611	—$3,322,887	3.4
Expenses	51,354,370	52,293,544	— 939,174	1.8
Net earn	41,992,354	44,376,067	— 2,383,713	5.4
Per mile:				
Gross earn	6,300	6,787	— 487	7.2
Net earn	2,834	3,116	— 282	9.0

Thus the decrease in gross earnings last year was 2¼ times the decrease in working expenses, and this with the increase of 4 per cent. in mileage worked caused the considerable decrease of 9 per cent. in net earnings per mile. Most of these railroads had a larger capital last year than in 1883, and in the aggregate the increase in capital was considerable, so that the interest earned on it was decidedly reduced last year.

As several of these railroads have been adding immensely to their mileage of late years, it will be interesting to see what the effect has been on their earnings per mile. These have been as follows, gross and net, for the last eight years:

Gross earn:	C., M. & St. P.	C. & N. W.	C., B. & Q.	C. & A.	Ill. Cen.	C., R. I. & P.
1884	$4,913	$6,118	$7,607	$10,249	$6,095	.....
1883	5,201	6,867	8,028	10,368	6,776	$8,827
1882	4,746	7,809	6,953	9,668	6,684	9,719
1881	4,445	7,312	7,256	8,992	6,503	8,957
1880	4,777	7,830	8,143	9,146	6,303	8,800
1879	5,016	6,848	8,289	7,313	5,772	8,364
1878	5,492	7,242	8,690	6,892	5,685	7,872
1877	5,784	6,539	7,773	6,586	6,034	10,698
Net earn.:						
1884	2,012	2,625	3,706	4,498	3,031	.....
1883	2,172	2,910	4,095	4,626	3,439	3,679
1882	1,909	3,642	5,312	4,389	3,453	4,354
1881	1,751	3,369	3,583	4,055	3,354	3,990
1880	2,128	4,025	4,240	4,314	3,521	4,189
1879	2,274	3,228	4,071	3,439	3,362	3,849
1878	2,378	3,500	4,056	3,181	3,227	3,501
1877	2,548	2,763	3,518	3,109	3,215	5,134

Here the Chicago & Northwestern earnings for the years previous to 1883 are for its fiscal year ending with May of the year named; and those of the Chicago, Rock Island & Pacific are for its year ending with March—nine months earlier than the calendar years.

The increases in mileage by the St. Paul have been great almost every year until last year. The chief part of the Burlington's great gain was in 1880, when it absorbed the Burlington & Missouri River Railroad in Nebraska. The Chicago & Alton opened its Kansas City line in 1879, and has added scarcely anything since. The Illinois Central's Southern lines are included for only two years, but these roads have now more than the average earnings per mile of the system, and so have tended to increase and not to reduce them. The Southwestern lines of the Rock Island were not included in 1877.

It appears that though there was a decrease in gross and net earnings per mile on the Milwaukee & St. Paul from 1883 to 1884, still in this last year the gross were greater than in any other year since 1879, and the net greater than in any other since 1880. A large part of the additions to this system were not new road when acquired, but old road purchased, much of it in Illinois, Wisconsin and Iowa, and a considerable part of the new road built probably has much more than the average earnings of the system. The acquisitions of the Northwestern, on the other hand, have been mostly new road in new country, and the largest new line of the St. Paul tends to reduce the traffic on 500 miles of the Northwestern. Thus the latter had smaller gross earnings per mile last year than in any other of the eight years, though its net earnings were greater than in 1877, 1881 and 1882.

The Chicago, Burlington & Quincy had lighter gross earnings per mile than last year only in 1881 and 1882, and lighter net earnings in these years and also in 1877. Its net earnings have been much better sustained than the Northwestern's, doubtless because the additions to its road are much more productive, and probably because it has suffered a smaller diversion of traffic to new routes.

The Chicago & Alton has a very large gain in gross earnings per mile, very slightly interrupted last year, and its net earnings have been more than maintained since the opening of its Kansas City line. The contrast with the other roads is doubtless due to the fact that it has no new road in new country to bring down the average earnings per mile; and it must be expected that when the new lines of the other companies become productive their earnings per mile will increase much more than the Chicago & Alton's.

The Illinois Central gained continually in gross earnings until 1883, but the decrease last year brings it lower than in any other year since 1879. Its net earnings per mile increased much less than the gross, and were less last year than in any other of the eight. This road had higher average rates than most of the other great railroads west and southwest of Chicago, and, as these have been forced down, the proportion of profit has become smaller, so that the same gross earnings yield a smaller profit. In 1878 the working expenses were but 43¼ per cent. of the earnings; last year more than 50 per cent.

After this period of great increase in mileage and decreasing earnings per mile, we shall almost certainly have a period of increasing earnings per mile, provided there is no great amount of new railroad construction, but it is by no means certain that this period has already begun.

CROSS-TIES.

The statistics of American cross-ties published in our closing issue of last year showed a great variety of dimensions in use, including, in fact, almost every possible combination between four different lengths (8 ft., 8 ft. 6 in., 9 ft. and 10 ft.), four different thicknesses (6, 6½, 7 and 8 in.), and five different widths (6, 7, 8, 9 and 10 in.). Neglecting the widths, as an indeterminate element not definitely fixed, the percentages for the entire United States of the various lengths were as follows:

Lengths.	8 ft.	8 ft. 6 in.	9 ft.	10 ft.	Total.
Percentages	63.5	27.6	8.9	0+	100.0
Thickness.	6 in.	6½ in.	7 in.	8 in.	
Percentages	54.4	3.8	41.4	0.4	100.0

In round figures, the leading standard dimensions may be said to be:

8 ft. long x 6 in. thick x 8 in. face,	*half* the whole number	(48.3 p.c.)
8 ft. 6 in. " x 7 " x 8 "	*one-fourth* " "	(22.3 ")
8 ft. " x 7 " x 8 "	*one-eighth* " "	(13.7 ")
All other sizes	*one-eighth* " "	(15.7 ")

While these variations are in part, and perhaps chiefly, governed by the conditions of the timber supply, they arise in part at least, we may safely assume, from varying views as to what is, abstractly considered, the best proportion for a tie—a question which it is therefore instructive to consider.

Intimately allied with this question, so that they can hardly be considered separately, is what may be called the question of Rails *vs.* Cross-ties. Track is constructed and made passable by the use of three agencies, (1) rails, (2) cross-ties, (3) tamping under the ties. Some proportion of each of these must be used to maintain a stable track, but in proportion as the stability from one of them is increased, that required from one or both of the others may be decreased. If we have a stiffer rail, we may use less ties and less track labor; if we have more or better ties, we may use a lighter rail, if we put more labor into maintenance, we may dispense with some expenditure on either rails or ties, or both. The different modes of yielding, outlined in figs. 1 and 2, which occur more or less on all track, may be assumed to arise, and will arise, from deficiencies in any one of these three requirements, either the rails or ties or tamping, and may be cured, in part or whole, by spending more money on either one of them. On which of them will it be expended most economically? It is obvious that our recent discussion of the question of weight of rails (March 13) was incomplete in that it considered the rails only, irrespective of this question of comparative economy as between rails and other methods of obtaining stability.

Still another, which may be called a *negative* method of increasing stability, is to decrease the demand for it by using lighter engines. This question, however, as well as that of expenditures on maintenance, we cannot now attempt to consider, confining ourselves to that of ties, or ties and rails.

Assuming as a standard of comparison a 6 by 8 in. tie, 8 ft. long, spaced 2 ft. apart, or 2,640 per mile, the following combinations of spacing and width will afford an equal bearing surface of ties on the roadbed

and of rails, but will be seen to afford a very unequal support to the rail:

Ties per mile.....	2,640	3,000	3,168	3,520
Distance apart, centre to centre.....	24 in.	21.12 in.	20 in.	18 in.
Average width of face..	8 in.	7.04 in.	6.67 in.	6 in.
Clear space, tie to tie....	16 in.	14.08 in.	13.33 in.	12 in.
Comparative stiffness of same rail for each span	1.00	1.47	1.73	2.37
Comparative weight of rail to give same stiffness..... ...1.000		0.825	0.761	0.650

The method of determining the comparative stiffness and comparative weight of rail in the last two lines is the same as used in the article on rails referred to and need not be repeated. Whether we compute the *comparative* stiffness of the rail for spans from centre to centre of ties, or for one clear span between ties, or for spans omitting one tie, as in fig. 1, the result is the same, although the absolute stiffness will of course vary greatly.

Taking the extremes of the table we see that the addition of 880 ties, or one-third increase, gives so much additional support to the rail that (assuming the support to each tie to be the same) a rail only two-thirds as heavy will distribute the load as well from tie to tie. Not forgetting that stiffness is only *one* of the *three* qualities in a rail which are gained by increasing its weight, this great difference still indicates that increasing the number of ties to the extent of practical possibility (their dimensions remaining the same) adds much more to the aggregate stiffness of the track than the same amount spent on rails, as thus:

The cost of 880 more cross-ties per mile, more than doubling the stiffness of the same rail, amounts

At 25 cents, to	$220 =	7.14	tons rails at	$30 =	4.5	lbs. per yard
" 30 " "	264 =	8.80	" "	"	= 5.5	" "
" 40 " "	352 =	11.73	" "	"	= 7.3	" "
" 50 " "	440 =	14.67	" "	"	= 9.1	" "

Comparing this with the figures given in Table I. of the article on rails referred to, giving the comparative stiffness of light and heavy rails, we have the following comparison for various light rails—for which rails only the comparison is at all close:

Original weight of rail.....20 lbs.	35 lbs.	50 lbs.
Stiffness in d's, taken as 1.00	1.00	1.00
Adding 4.5 lbs. per yard (= cost of 880 ties at 25 cents each, as above) makes stiffness.... ... . 1.51	1.27	1.19
Adding 9.1 lbs. per yard (= cost of 880 ties at 50 cents each) makes stiffness..... ... . 2 12	1.57	1.40
Whereas, the same sum spent on ties, increases the stiffness, as above, to..... ....2.37		

While the addition of so large a number of ties, without decreasing their width, can rarely be practicable, and while the comparison is not strictly exact for other reasons, this does indicate clearly the general fact that, increasing the number of ties to the limit of convenience is a cheaper way of increasing stability than increasing the rail-section, even for very light rails. On the other hand, the total stability which is obtainable from ties is limited by the number which it is possible to use, so that what these figures in fact indicate is, that, in endeavoring to get the utmost stability at the least cost, the *first* essential is to use ties as freely as is possible, and the *next* essential is to decide between a heavier rail and more tamping to supply the deficit.

The physical limit to the increase in number of ties, of ordinary standard width, is probably 2,800 per mile, but if, as in the first table above, we consider the width of the ties to be diminished as their number is increased, this limit is considerably higher. In the statistics recently gathered by us, and above referred to, several lines reported that they were using 3,100 to 3,300 narrow ties per mile with very satisfactory results. Remembering, as we saw in the article on rails referred to, that the stiffness of a rail decreases as the *cube* of the span, it is obvious that by dividing up the bearing surface among a greater *number* of ties, so that the aggregate area remains the same, we measurably obtain two desirable ends at once; we give much more effectual support to a weak rail and we in general reduce, instead of increasing, the total cost of ties, since the cost of ties will usually increase faster than the required minimum face. As, therefore, the necessary space between ties varies approximately with the width of face, and is about twice the face (so that full width ties cannot be used with very narrow spacing), the utmost economy would seem to require that narrow ties spaced close together should be given a decided preference at the same cost for ties per *mile* when a light rail is to be supported, and there are few rails indeed in this country which cannot be said to be light in proportion to the duty imposed on them. It could not rationally be expected, indeed, that 6 in. ties spaced 18 in. apart, instead of 8 in. ties spaced 24 in. apart, would increase the stiffness of a light rail from 1.00 to 2.37, as the above table indicates; yet we may justly conclude that it will be increased very greatly, with a possible decrease in the total cost of ties as well, where the supply of large timber is small. In not a few localities ties of 5 or 6 in. face can be had for but little more than half the cost of ties with 8 in. face.

But the stability obtainable from ties depends not alone upon their number and width, but upon their length and thickness. A cross-tie is an inverted *cantilever*. In fig. 2 we have a tie (yielding as they all do more or less under a load), and by inverting fig. 2 it will be seen that we may consider the tie as a cantilever beam, supported upon two piers (the rails) and loaded with a more or less uniformly distributed load. If the tie were perfectly stiff, it would be an evenly distributed load, and the pressure of the tie upon the soil would be uniform for every square inch of its bearing surface. If the tie be very thin, the conditions of the exaggerated sketch, fig. 2, will literally obtain. The middle and ends of the tie will then be able to transmit but little pressure to the ballast, and (since the total pressure transmitted must in any case be the same) an excessive and destructive pressure will be thrown upon the road-bed directly under the rails, causing rapid deterioration therein. This may be shown by the load-diagram below, fig. 2. Let us suppose that a tie be so thin, or the nature of the support so unyielding, that the load per square inch directly under the rail is *three times* as great as at the ends and in the middle, as shown by the full line in the diagram below, fig. 2—a very common difference, if not, indeed, one almost universally exceeded in occasional instances, even on a very good track. An increase of stiffness which would double the load on these lightly loaded extremities would produce, as will be seen from the diagram, an absolutely uniform distribution of pressure, and although this can never be fully realized, yet it is plain that it may be approached.

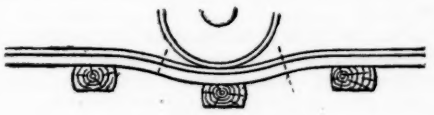

Fig. 1.

Now the stiffness of any beam, however supported or loaded, is in proportion to the *cube* of its depth (or thickness of tie) and of its lengths between supports (or the gauge). Any attempt to compute from these facts the *absolute* requirements, or distribution of load, with a given tie or gauge, would be preposterous. There is no absolute requirement, since, however well maintained the track, occasional ties are badly or unequally supported; and since the load is far more than sufficient to break any tie in two at the middle if only supported at that point (a *dead* load of 14,000 lbs. per wheel would probably break such ties the first time it was imposed), it is for these maximum demands, and not the average, that we must provide. Therefore, speaking *comparatively* only, and taking a tie 6 in. thick as the basis of comparison, we have the following:

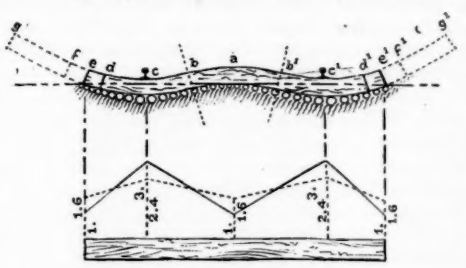

Fig. 2.

Thickness.	Comparative stiffness.	Thickness of narrow-gauge (3 ft.) tie of— equal stiffness.	equal strength.
5 in.	0.58	3.18 in.	4.30 in.
6 "	1.00	3.82 "	5.16 "
7 "	1.59	4.46 "	6.02 "
8 "	2.37	5.10 "	6.88 "

From this it is clear that although the nominal bearing surface of a tie is not increased by increasing its thickness, yet that the *effective* bearing surface is likely to be very materially increased by a very moderate increase of thickness. By increasing the thickness from 5 to 6 in., we nearly double the stiffness; by increasing it from 6 to 7 in,, we increase the stiffness 59 per cent., giving the effect outlined below fig. 2, in which the full line shows the assumed distribution of pressure with a tie 6 in. thick, and the dotted line the effect on the latter of thickening the tie 1 in.

This might make little difference with heavy rails and well-tamped ties, lightly loaded; yet when the support is very rigid in the centre or at the ends, so that the tie can yield but little, or when the support is very imperfect, so that the road-bed immediately under the rail cannot bear any excessive load, but must permit the tie to bend, this gain of stiffness may become very important. Economizing in the thickness of ties, therefore, would seem to be one of the poorest ways of saving money.

This is more fully seen by comparing the effect of difference of length. According as the distribution of the "load," or pressure on the base of the tie is varied, the theoretical curve of flexure may be varied almost indefinitely. Under the conditions of load sketched in fig. 2, the flexure will be chiefly directly under the rail, the extremities curving but little; but under ordinary working conditions the support directly under the rail will inevitably become imperfect, if an excessive load be concentrated there, until it readily permits sufficient flexure to transmit the load to the parts away from the rail; and a tie which is under fair conditions to permanently fulfill its office of distributing the load may be considered to curve into the three circular arcs shown in fig. 2, from which it will be apparent that, under whatever assumptions as to the curve of flexure, there is a clear limit to the useful increase of length in ties *at a point considerably within a length of twice the gauge f f'*. At a length of about 1¾ times the gauge, the load from the rails comes on the ties in the most favorable point to be distributed as uniformly as possible and to maintain the section of the tie immediately under the rail always horizontal. If the tie be made longer, as, for instance, extended to *f f'*, or, still worse, to *g g'*, either the extra length will carry little or no load (which is most likely), or, if the support nearer the rail has given way so as to throw load upon it, it will be very liable to break the tie. If the tie be made shorter, the load thrown on the middle of the tie will be disproportionately increased until, if we conceive the tie cut off close to the outside edge of the rail, the load per square inch will, in the first place, be very greatly increased, and, in the second place, the strength of that portion of the tie between the rails, considered as a beam, is diminished by about *one-half* and its stiffness about *seven-eighths;* because the effective span of the beam has, by cutting off the projecting ends, been almost doubled—*i. e.*, increased from *b b'*, fig. 2, to *c c'*.

For the most efficient service from ties, therefore, we have a certain quite narrow limit of length, the minimum being about 7½ ft., and the maximum about 8½ to 9 ft., for the ordinary gauge of 4.71 ft. It is clear from the above that any increase of length above 8 ft. gives a far less effectual way of disposing a given quantity of wood (to obtain an approximately uniform pressure on the ballast and so keep down the maximum), than to increase the thickness, provided the nature of the timber permits it. The *apparent* gain of bearing surface by increasing the length of ties from 8 ft. to 9 ft., and the *apparent* absence of gain in bearing surface by increasing the thickness from 6 in. to 7 in., will be seen to be precisely the reverse of the true conditions, and we may well believe that this deceptive contrast has been the chief cause for such awkward combinations as an 8½ or 9 ft. tie with only 6 in. thickness, which prevails with 6.1 per cent. of the ties in the United States.

It will also be seen from the above, and from fig. 2, that it is not quite true, as is often asserted, that narrow-gauge rails may be moved out to standard gauge on narrow-gauge ties and still obtain the same support from the ties. Since a tie cannot be either more or less than about 1¾ the gauge without injuriously affecting the distribution of the pressures and the strength of the tie as a beam, we can, with a narrow gauge, use 5 or 6 ft. ties and get good service from them, whereas with the standard gauge we cannot use less than 7½ to 8 ft. ties and get good service from them, the loads remaining the same. By moving out rails to 4 ft. 8½ in. gauge on 6 ft. ties, we very materially decrease the stability of the road-bed and the strength of the tie as a beam, so that they would be very likely to break in the middle.

But this fact is a two-edged sword, cutting both ways. While the best use of short ties requires a narrow gauge; yet, on the other hand, with a narrow gauge, we cannot use long ties if we would to increase stability to any advantage, for we shall get little good from their extra length. We are thus estopped from buying our stability in the cheapest market. An 8 ft. tie for a 3 ft. gauge is as long proportionally as a 13 ft. tie for standard gauge, and would extend to *g g'* in fig. 2, where it is clear that the extremities are of little or no use, except to furnish leverage for breaking the tie or crushing it under the edge of the rail. As, therefore, tie stability, in so far as it can be obtained and used, is cheaper than rail stability, this apparent advantage of the narrow gauge is, more justly considered, a serious disadvantage, furnishing another proof that "the destruction of the poor is their poverty," in that they are unable to choose the time and place for supplying their needs.

The Efforts to Maintain Rates by the Trunk-Line Western Connections.

A good deal of earnestness was manifested at the meeting of the western connections of the trunk lines last week, at their meeting in Chicago, and there seems reason to believe that they will try hard to maintain rates in the territory west of Buffalo and Pittsburgh. There should be no unsurmountable obstacles to their doing so, even while the eastern trunk lines carry for less than cost, but the difficulties are no less than when they endeavored to regulate them in connection with the trunk lines, unless there may happen to be more unanimity among the western roads now, and unless they will make a greater effort now when they are left to save themselves on their own responsibility than when they were only one and generally the less powerful of the parties working in the Joint Executive Committee. There is some reason to think that there is more unanimity and that they will make greater effort than heretofore, and this may make all the difference between success and failure. Still, so far the companies have only resolved that they will maintain rates, and the whole problem consists in the means provided for carrying out their good resolution, which it remains for them to perfect.

Substantially, there is to be a new Western Association, corresponding to the Trunk Line Association, and consisting substantially of all the companies belonging to the Joint Executive Committee except the eastern trunk lines. The new association proposes to perfect pools covering the business west of the eastern trunk lines, and including some business never heretofore pooled. As we have said heretofore, there is nothing in the nature of things to prevent the roads west of Pittsburgh and Buffalo getting a higher rate per ton per mile than the trunk lines, and there is a good deal to be said in favor of their charging a higher rate as a permanent policy, just as the railroads west and northwest of Chicago get higher through rates than their eastern connections, and the trans-Missouri roads get higher rates than the roads which give them an outlet to Chicago.

The immediate difficulties in the way of maintaining rates on the western connections of the trunk lines are at present mainly these: A number of new routes have been formed within a year or so which, though some of them are quite circuitous, are able to have a great effect on rates. Three or four such routes have carried freight from Chicago, in addition to the eight which were in the Chicago pool. We have heretofore mentioned the route by the Wabash southwest to Forrest and thence northeast to Detroit, a very circuitous route, but direct enough to affect rates. Besides this the Cincinnati, Indianapolis, St. Louis & Chicago has carried New York freight to the Lake Erie & Western at Lafayette, and freight for Baltimore to Cincinnati, getting a haul of but 75 miles on the former, but of 253 miles on the latter. The Louisville, New Albany & Chicago has at times fed the Chicago & Grand Trunk by a roundabout route, and the Chicago & Eastern Illinois has also carried some of the Chicago shipments to the east. Now it is reported that the Wabash has made a contract with the Chicago & Atlantic for running rights over that road from the junction of its Detroit Division at Newton to Chicago, 123 miles, giving it a Chicago-Detroit line about 296 miles long.

It is characteristic of all the new routes except that *via* Cincinnati to Baltimore, that the roads at the Chicago end get but a short haul on the business, but they are not all of them in themselves unfavorable routes, though nearly all must use eastern outlets which would much prefer to get their Chicago business by another route. Now the shortness of the haul of the roads at the Chicago end of these lines, while it may make them not as anxious as some other roads to get a large share of the business, because they have not much to gain by it, on the other hand makes them look with something like indifference on the the total destruction of the value of the business, because they have not much to lose by it. And when one of them has a large interest in the traffic of some other place than Chicago, it may use its power over the great Chicago business to enforce its claims regarding that other business which is more important to it. It is true that if the roads further east work steadily together, these routes cannot do much harm, because they can be made to pay full rates over the remainder and larger part of the distance; but there have been two or three lines across Indiana and Ohio which were glad to get anything to carry from Chicago, and when the eastern trunk lines are at loggerheads, as at present, an almost complete line can be made of roads which have or think they have an interest in getting a share of the shipments or spoiling the value of the whole. Now, if all these routes, or the Chicago ends of them, can be got to coöperate with the other roads to maintain rates, one of the chief of recent difficulties will have been removed. If it is done by giving them a share of the business, it will still further reduce the percentages of the older Chicago roads, as was done by the opening of the Chicago & Grand Trunk in 1880, and of the Nickel Plate and the Chicago & Atlantic in 1883.

Another obstacle to the maintenance of rates in the West is the want of a pool at Milwaukee. At the Chicago meeting last week it was resolved that the Milwaukee business ought to be pooled with the Chicago business. But to this the Grand Trunk objects. Its chief route to Milwaukee is by the Detroit, Grand Haven & Milwaukee to Grand Haven, and thence by steamboat. On account of the long ferry, a lower rate has been made by this route than by the all-rail route *via* Chicago. If rates are maintained then here, the total Chicago business will be made larger and the total Milwaukee business smaller. The shipments not crossing the lakes have always gone into the Chicago pool, like other freight from the West passing through Chicago.

Further, there are junction points in addition to those included in the Chicago pool at the beginning last year, especially Seneca, where the Cincinnati, Indianapolis, St. Louis & Chicago connects with the Rock Island, which need to be pooled to protect the rates.

Then there is a large traffic brought from Missouri River points and other trans-Mississippi points which the railroads forwarding it have been able to "auction off," as it were, to whichever road to the East would give them most for it, reaching them at obscure junction points in the interior of Illinois. This has been a two edged sword, for it has enabled the western roads which could so dispose of their traffic to make better through rates than their rivals, while perhaps receiving just as much for their share.

And this suggests another difficulty, not easy to provide against. As a rule, the lower the rates from Chicago to the East, the better it is for the railroads from Chicago to the West. And, indeed, this is true generally of the Western railroads. A very large part of the traffic of the country which supports them goes east to the seaboard, or even to Europe. Generally it may be said that the less this traffic to the carriers east of Chicago, the more it is able to pay to the carriers west of Chicago. And though a reduction of freights to the East is not followed by an increase of rates on the Western roads, it tends to leave more money in the pockets of the people who support the Western roads, and to encourage the growth of the Western country. It would be a great thing for the Chicago railroads were the sea to be brought to Chicago, and rates to Europe thence be as low as from New York. Now, the advantage would result not from the salt water, but from a reduction in the price of transportation, and it makes little difference how the reduction is secured, whether by the lower cost of carriage by sea or lake, or by the owners of railroads sacrificing the interest on their investments. What the railroad companies are doing now is equivalent to moving the harbors of New York and Boston far inland and close to Chicago and St. Louis, at the expense of their stock and bondholders. If all the roads east of Chicago and St. Louis coöperate, however, they can maintain rates without the aid of the roads further west.

The representatives of the passenger departments of the roads west of Buffalo and Pittsburgh held their meeting in Indianapolis the day before the Chicago meeting, and acted with great unanimity. They also determined to restore rates at the beginning of this week, and to form a "Central Association," including the lines in the territory concerned for the purpose of maintaining them. But, as in the other case, everything depends on the means adopted, and the organization of the association was assigned to a meeting appointed for Thursday of this week. There is, we believe, no talk of pooling the passenger business, and the task of maintaining rates without pools will be a very hard one. Probably the payment of commissions will be one of the matters regarding which the new association will make strict regulations. It is encouraging to see that the passenger men are taking the initiative in this matter. Heretofore it has sometimes seemed as if the railroad companies reserved their passenger agents for a fighting force, and came on the field themselves when any peaceful co-operation was desired. The passenger men ought to understand what it is possible to do in regard to their branch of traffic better than any one else, and be able to devise the most practicable measures for protecting it. It will certainly be a great point gained to have their general and hearty co-operation in any scheme for maintaining rates.

The Chicago, Burlington & Quincy Railroad Company shows in its report that at the close of 1884 it had the very large capital of $153,610,754, about half stock and half bonds. Of this $25,725,289 represents the cost of the stocks and bonds of other roads which this company owns, so that we have as representing its 3,467 miles of road and its heavy equipment $127,885,465 of stock and bonds, which is at the average rate of $36,890 per mile of road.

This very light capital account is the secret of the steadiness with which this road earns large dividends. A great many railroads, not as well built and equipped as the Burlington, have a funded debt per mile larger than the whole stock and debt of this company.

The reports of railroad earnings in March so far received are chiefly from railroads northwest of Chicago. The two great companies, having together 8,600 miles of road, have a large increase over last year, but the Chicago & Northwestern has 7½ per cent. less and the Milwaukee & St. Paul not 2 per cent. more than in 1884, when they had about 10 per cent. less road. The St. Paul & Omaha earned a little less than last year. The earnings of these three railroads in February for five years have been (with a constantly increasing mileage):

	1881.	1882.	1883.	1884.	1885.
C., Mil. & St. P...	$916,089	$1,361,396	$2,013,730	$1,788,725	$2,682,000
Chic. & N. W. ..	1,178, 93	1,672,931	2,0[illegible]2	1,765,940	1,9 8,000
C., St P., M.&Om	251,649	413,226	438,571	404,2.6	451,000

March in 1881 was perhaps the worst month for snow blockades ever known, and some new lines of these companies were not worked at all then. In 1883 the March earnings in the Northwest were unusually great, however—greater on all these roads than in the following April. Last year there was the more usual course of a considerable gain from February to March and a moderate gain from March to April. Doubtless the hindrances to traffic in February last caused the March business to be greater.

The two great roads northwest of St. Louis have earned in March, for five years:

	1881.	1882.	1883.	1884.	1885.
Northern Pacific.	$162 984	$373.141	$563,903	$978 956	$686.427
St. P., M. & Man.	320,932	531,004	729,813	7.0,100	575,377

Thus the Northern Pacific has suffered a decrease of 30 per cent. and the Manitoba one of 18 per cent. compared with last year, and the latter earned less last year than in 1883. Last year in the spring the Northern Pacific profited greatly by the rush to the Cœur d'Alenes gold mines, and the effect of this probably began in March: but the lack of this business does not affect the Manitoba, and it is probable that both roads have suffered in common from some other cause. March is the month when the business of these roads begins to revive, as witness their earnings in successive months for four years past.

		Jan.	Feb.	March.	April.
Northern Pacific..	1882..	$245,369	$268,935	$373,141	$451,023
	1883..	358,985	528,158	563,9 3	660,412
	1884..	614,103	520,085	978,956	1,441,514
	1885..	556.092	569,562	686,427	.....
Manitoba.....	1882..	295,461	418,358	531,004	570.890
	1883..	489,764	589,612	729,313	812,017
	1884..	449,306	407,128	70.,100	804.099
	1885..	466,125	392,248	575,377	.....

In the case of the Northern Pacific the gain from February to March was 40 per cent. in 1882, 70 per cent. in 1883, 90 per cent. last year, but only 20 per cent. this year. In the case of the Manitoba the increase from February to March was 27 per cent. in 1882, 90 per cent. in 1883, 72 per cent. last year and 47 per cent. this year. These roads were not obstructed by snow much in February and therefore did not have their March business increased by the postponement of February business, as was the case on the Chicago roads. But March is usually the opening of the season with them, and it has not opened favorably. The movement of emigration only begins then, but is, perhaps, at its height in April. This movement will probably be lighter this year than heretofore for some years. A country where wheat-growing is the chief industry is not so attractive now as for some years previous.

The Chicago, Burlington & Quincy in February.

In commenting on the January earnings of the Chicago, Burlington & Quincy Railroad about a month ago, we said that while they were much larger than in 1884, it was probable that the February earnings would be less than last year, because they were unusually large last year, and the snow blockades were unusually bad on this road this year. Actually the report for February shows compared with last year:

	Gross Earnings.	Expenses.	Net Earnings.
Amount.....	Dec. $369,098	Inc. $90,379	Dec. $459,478
Per cent.	18.7	8.9	48.0

This is only what was reasonably to be expected. The decrease in gross earnings was doubtless only partly due to snow, but partly to the fact that they were exceptionally large last year, when circumstances postponed the movement of considerable traffic from January to February; the increase in expenses was the natural result of the blockades, which resulted in great destruction of rolling stock as well as

expenditures for clearing the road, and the great decline in net earnings follows.

For the last six years the gross and net earnings and working expenses in February have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1880	$1,411,870	$731,269	$680 601
1881	1,034 821	711.996	322,825
1882	1,457,301	844 303	612,298
1883	1,711,021	988.298	722,723
1884	1,371,013	1,012,848	958,165
1885	1,601,915	1,103,227	498,688

Thus, compared with years previous to 1884 the decrease is not so formidable, and is quite similar to, though not so severe as, the decrease in 1881, when also there was a terrible winter, and this road suffered a decrease of 27 per cent. in gross and 52½ per cent. in net earnings. Compared with 1883 the decrease this year is 6 per cent. in gross and 31 per cent. in net earnings.

For the two months ending with February the earnings and expenses have been:

Year.	Gross earnings.	Expenses.	Net earnings
1880	$2,844,610	$1 382,663	$1,461,947
1881	2,342,769	1,423.886	918,883
1882	3,116,135	1,733.222	1,382,913
1883	3,236,701	1,706,581	1.530,120
1884	3,6 9,233	2,025,553	1,593,680
1885	3,594 399	2,233,181	1,361,218

Thus for the two months the gross earnings this year were very nearly the same as last year and much larger than in any previous year, the increase in January having been nearly as great as the decrease in February; but owing to an increase of 10 per cent. in the working expenses, the net earnings this year were 14½ per cent. less than last year and less than in any other year since the acquisition of the Nebraska roads, except 1881.

The February decrease was doubtless exceptional and due to the storms, as is indicated by the January earnings, which were much larger than ever before. The season as a whole is likely to make better returns than last year, though the increase in expenses due to the severe winter will probably continue through March and perhaps longer.

Erie Earnings and Expenses in February.

The New York, Lake Erie & Western reports a considerably decrease of gross earnings in February, but such a reduction of expenses that the decrease in net earnings is trifling. For eight years the earnings and expenses of the Erie proper have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1878	$1,121.412	$804,847	$316.565
1879	1,207.391	934,976	273,315
1880	1,252,217	909,633	342,584
1881	1,425,765	1,059,160	366,605
1882	1,304,757	1,013,057	291,700
1883	1,283,616	1,049,816	233,80[illegible]
1884	1,233 409	925 362	308,347
1885	1,139,740	849,532	290,208

Thus the gross earnings were less this year than in any other since 1878, and $93,669 (7½ per cent.) less than last year; the working expenses were also less than in any other year since 1878, 8 per cent. less than last year and 19 per cent. less than in 1883; while the net earnings were but $18,139 (6 per cent.) less than last year, *more* than in 1883 and 1879, and about the same as in 1882. February last year gave a more favorable result than January or December. Meanwhile there was a loss of $54,381 on the lease of the New York, Pennsylvania & Ohio road this year, against a loss of $70,126 last year, and taking this from the net earnings of the Erie road we have, as the income of that company, $235,827 this year against $238,221 last year, a decrease of but $2,394, or 1 per cent. This is to be compared with the net earnings of the Erie proper in years previous to 1884, before the lease.

The total earnings and expenses of the New York, Pennsylvania & Ohio in February were:

	1885.	1884.	Decrease.	P. c.
Gross earnings	$341,606	$388,506	$47.5 0	12.2
Expenses	286,766	333,111	46.845	14.1
Net earnings	$54,740	$55,395	$655	1.2

Thus the decrease in expenses was substantially equal to the large decrease in earnings. The net earnings were only about half as great as the rental this year, and much less than half last year. February is usually the month of smallest net earnings on this road, and it is not to be expected that it will earn its rental in that month even in favorable years.

For the five months of the company's fiscal year ending with February the earnings and expenses of the Erie proper have been, for the past eight years:

Year.	Gross earnings.	Expenses.	Net earnings
1877-78	$6 996,849	$4,061.893	$2 234,956
18 8-79	6.415,242	4.513.491	1.901,751
1879-80	7,176,375	4,860, 87	2.316,088
1880-81	8,2 98,8 8	5,491,892	2,801,346
1881-82	7 7 25,297	5,604,172	2,121,125
1882-83	8,137,722	5,757,071	2,380,651
1883-84	7,728,305	5.472,900	2,255,405
1884-85	6,335,611	4,492,363	1,843,248

Compared with last year and 1883 the decreases are:

1884:	Gross earnings.	Expenses.	Net earnings
Amount	$1,392,694	$1,060,537	$412,157
Per cent	18.0	19.4	18.3
1883:			
Amount	1,802,111	1,264,708	537,403
Per cent	22.1	22.0	22.6

The gross earnings were larger than in any other year since the reorganization, and so were the working expenses and net earnings. Last year the net earnings had not been greatly reduced in these five months, unusually large ones in October having nearly balanced unusually small ones in December and January.

There was a *profit* of $29,228 on the lease of the New York, Pennsylvania & Ohio road this year, against a *loss* of $158,623 last year, and the net income less rental of the Erie from both roads was thus $1,872,476 this year, against $2,096,783 last year, a decrease of $224,307, or 10.7 per cent., nearly half of the loss on the Erie proper having been made good by the gain on the leased Ohio road, whose earnings and expenses for the five months were:

	1884-85.	1883-84.	Decrease.	P. c.
Gross earnings	$2,195,642	$2,574,993	$379,351	14.8
Expenses	1,463,805	1.909,618	445,809	23 3
Net earnings	$731,833	$665,375	$66,458	10.0

Compared with the Erie proper the percentage of decrease is somewhat less in gross earnings and very much less in net earnings, the decrease in expenses having been greater. The improvement in the result to the Erie in spite of smaller net earnings is due to the lower rental this year, this decreasing with the gross earnings, and amounting to $702,606 this year, against $823,998 last year.

The terms of the lease make it to the interest of the Erie to refuse shipments which do not yield a considerable profit. Ordinarily, it is of advantage to a railroad to carry any freight which adds more to the earnings than to the expenses. But as the Erie must pay [out 32 cents out of every dollar of *gross* receipts on this road, it will lose by carrying any freight which does not yield this proportion of the rate in profit, unless it makes a profit on the shipment on its own road equal to the excess of rental over net earnings on the leased road. For instance, assuming that grain carried last week at 17½ cents per 100 lbs. from Chicago to New York cost 15 cents for carriage, then for every dollar received for carrying it over the New York, Pennsylvania & Ohio the net earnings were 14.3 cents, and the rental paid by the Erie 32 cents; on the Erie proper the net earnings from the same freight would probably not be enough to make up the rental. Thus it is for the interest of the Erie to refuse freight which yields some net earnings, while it is for the interest of the New York, Pennsylvania & Ohio to carry at any rates, even far below cost, since it receives 32 per cent. of the gross receipts and the Erie pays the expenses.

Chicago through rail shipments eastward of flour, grain and provisions this year for the week ending April 4, and of all freights in the corresponding week of previous years, have been, in tons:

1886.	1881.	1882.	1883.	1884.	1885.
65,626	53,838	32,447	57,094	90,753	75,109

The shipments were considerably less this year than last, when they were with one exception the largest ever made in a single week, and when the basis of rates was 15 cents, while this year probably it was 17½ cents, or possibly a little more.

For six successive weeks the total shipments and the percentage of the whole going by each railroad have been:

	Week ending					
Tons:	Feb. 28.	Mar. 7.	Mar. 14.	Mar. 21.	Mar. 28.	Apr. 4.
Flour	15,549	17,153	20,600	24,753	20.236	22,867
Grain	30,913	36,354	38,989	47,087	44,805	46,894
Provisions	6,703	7,474	7,086	5,134	6,041	5,948
Total	53,168	60 981	66,675	75,974	71,082	75,109
Per cent:						
C. & Grand T.	6 0	10.2	8.2	7.0	9.8	19.2
Mich. Cen.	11.0	8.1	14.3	24 6	25.7	27.4
Lake Shore	18.7	17.0	17.1	11 8	6.8	4 6
Nickel Plate	8.2	5.1	7.2	8.9	11.3	9.4
Ft. Wayne	22.5	24.0	2[illegible].2	19.3	21.1	19 8
C., St. L. & P.	13.8	14.6	10.2	11.7	14.4	12 5
Balt & Ohio	9.1	7.3	11 1	7.2	7.2	5.3
C. & Atlantic	10.7	13 7	11.7	9.5	3.7	1 8
Total	100.0	100.0	100.0	100.0	100.0	100.0

Thus the shipments last week were about 5 per cent. more than in the fourth week and but little less than in the third week of March, but they were 9 per cent. less than in the first week of February last, and not quite so great as in the last week of January. The flour shipments continue to be extraordinarily large. Compared with last year the grain shipments were a third less. The provision shipments have often been exceeded.

In percentages there are great and unusual changes. The Chicago & Grand Trunk, which since early in January has had but a small share, suddenly increased it to a large one, but not at the expense of the Michigan Central, which further increased its unusually large percentage of the week before; but of the Lake Shore, the Baltimore & Ohio and the Chicago & Atlantic, the latter carrying but a trifle. Again the two Pennsylvania railroads lead in flour shipments, together taking 47.7 per cent. of the whole; but unlike the previous week, the Chicago & Grand Trunk also was a large carrier of flour, taking 21.3 per cent. of it, and there was left but 21 per cent. to the other five roads. This freight is particularly subject to diversion by contracts at cut rates. The Grand Trunk led in provision shipments, with 28 per cent. of the whole, but these are now but a very small part of the whole, though the profit on them is much larger than on grain and flour when the rate on the latter is down to 17½.

The railroads agreed to maintain a 20-cent rate strictly, beginning with last Monday, and so far as prior engagements permitted, they probably did so. At the meeting in Chicago last week it is reported that *most* of the companies announced that they had no outstanding contracts to prevent their restoring rates, which is evidence that some of them had such contracts. This may not prevent, however, the enforcement of full rates for all new offerings.

The Texas & New Orleans Railroad, which forms the western section of the Southern Pacific Company's line from New Orleans to Houston, and is the sole rail connection from the southern half of Texas to New Orleans, has earned as follows:

	1881.	1882.	1883.	1884.
Miles	104	104	181	208
Gross earnings	$761,361	$816.511	$1,164,188	$872,141
Expenses	363,738	391,324	574,704	516,621
Net earnings	$399,593	$425,187	$588,484	$355,520

The main line from Houston to the Sabine River is 104 miles long. In April, 1883, the company acquired a road of nearly equal length at right angles to the main line, and crossing it near its eastern end, through a wooded country, which probably yields very light earnings now. The main line yields larger earnings per mile than any other Texas railroad, with the exception of the 50 miles long Galveston, Houston & Henderson, and probably the main line of the Houston & Texas Central. In 1882 they amounted to $7,777 per mile. The new branch has reduced them greatly, and in 1883 they were $6,426, and last year only $4,198. Last year, however, the road was entirely closed by floods for a month at a time, and the traffic of Texas, which probably yields this road several times as much as the transcontinental traffic, was greatly reduced by bad crops. The net earnings last year exceeded the fixed charges only by a very small amount, while in 1883 the surplus, apparently, was more than 7 per cent. on the stock; and in 1882 more than 9 per cent., though no dividends were paid.

The Louisiana Western Railroad, which forms the intermediate section of the Southern Pacific Company's line from New Orleans to Houston, and is supported chiefly by the through traffic, suffered last year at once from a long total interruption of traffic due to floods on its connections, and to the general reduction of Texas traffic, due to bad crops. The road is 112 miles long, and its earnings have been:

	1881.	1882.	1883.	1884.
Gross earnings	$235,934	$408,567	$609,119	$485,706
Expenses	97,614	242,664	34 ,531	269.161
Net earnings	$137,620	$165,903	$259,588	$212,544

The road was open for the whole year first in 1881. Its earnings, in spite of the large decrease from 1883, were larger last year than in any other year, and were quite as large per mile ($4,336) as on most Southern roads. The net earnings exceeded the fixed charges about 40 per cent.

It is very much the fashion to regard workingmen a utterly unreasonable in the matter of wages, striking against a 10 per cent. reduction of their pay, though the price their employer receives for the manufactured article may have been reduced 50 per cent. Strikes and wages disputes are, however, often precipitated by a sense of unfair treatment, and seldom occur where confidence and a good understanding previously existed.

The following paragraph from an English journal, *Iron*, shows that the men are quite able to reciprocate generosity, and help their employer, as in times past he has helped them:

"We learn that the puddlers and millmen employed by Messrs. William Cooke & Co., Sheffield, have taken a step which is without parallel in the iron trade. They have intimated to the firm that they are well aware of the difficulties under which the company had labored in consequence of the stagnation in the iron trade, and as their wages cannot be reduced, owing to their being governed by the South Staffordshire Board of Conciliation, they have decided at a meeting that it is their duty to help their employers to tide over the period of adversity. They have therefore agreed to work a week for nothing, and express the hope that their offer will not be rejected."

It is to be hoped that an occasion to call for such a sacrifice may rarely occur, but it would be well if the mutual respect and good feeling the men's offer evinces became more general.

The Franklin Institute announces a "Novelties Exhibition," to be held in Philadelphia from Sept. 15 to Oct. 31 of the present year. The exhibits are to be restricted, it is stated, first to those which are "novel" (although no specific limit of date which shall constitute novelty is fixed), and secondly those which have "merit, to redeem them from triviality."

The idea of such an exhibition is good; all depends on the carrying it out. The curse of the larger exhibitions is the enormous mass of trivial and not especially meritorious exhibits, which look as if transferred bodily from shop windows for merely advertising purposes; but the difficulty of gathering in all the wheat with none of the chaff is great. The Franklin Institute, however, is an expert in giving exhibitions; what it has done heretofore in this way has been well done, and much more is to be hoped from an exhibition given under its auspices than from one projected and administered by volunteer amateurs, who have the art to learn, and often make sad work while learning.

In the discussion of Mr. Becker's paper on breakage of angle-bars, an abstract of which we published last week, the following further reports of tests of rails and joints were given, which should be compared with the table of tests given in the abstract referred to. The tests following were made by supporting the test-pieces on bearings consisting of iron cylinders, 4½ in. diameter, placed 20 in. apart, and applying the load at the centre through another cylinder of similar diameter:

	Permanent set.	Max. strength.	
1. 67 lbs. solid rail (4½ in high)	103,000 lbs.	229,000	Rail bent down 2½ in., no cracks.
2. Pennsylvania steel joint with Verona nut-lock	32,000 "	99,000	End bolt sheared, flanges turned up.
3. Pennsylvania steel joint, inverted	24,000 "	48,000	One bar cracked as in service.
4. Two angle bars only, bolted together without rail	26,000 "	52,000	One bar cracked.

By comparing Nos. 2 and 4 above, it will be seen that the joint complete is a little stronger than the angle-bars only, but only a little, within the elastic limit, which is the only important consideration. The strength of ordinary track bolts, within the elastic limit, is given in the same discussion as 9,000 lbs.

The contract of the English government for the military railroad from Suakim to Berber is a very simple one, of a kind which any contractor might be glad to receive, but the

like of which, in this country at least, has probably not been seen since the days of the "lace unpleasantness." There are but 21 sections in all to the contract, which provides, in substance, simply that the contractors shall build a railroad from Suakim towards Berber for as great a distance and on such general route as may be ordered, and with details of rails, ties, etc., subject to approval. All supplies furnished or purchased are to be inspected and, if invoiced at fair market price, paid for in full within 10 days of receipt of bill of lading. All employés are to be paid by the War Department monthly, the rates of pay (but not apparently the number of employés) being subject to approval.

The compensation to contractors is 2 per cent. on the amount of the disbursements, payable at the same time as the various accounts, and as a part thereof, up to a maximum of £20,000 ($97,200); with an equal sum payable at the sole discretion of the War Department within three months after the completion of the entire work, or by proportional installments as the work progresses, should the department so elect and decide.

The contract therefore amounts in effect simply to the engagement of the firm (Messrs. Lucas & Aird) as salaried agents of the department, with large discretionary powers, at a gross compensation of from $100,000 to $200,000, depending on the view which the War Department takes of the efficiency of their services, and the more costly they make it the more they will get.

By the way, a reconnaissance of this route was made several years ago by a member of the American Society of Civil Engineers, Col. H. G. Prout, then an officer in the Egyptian army, and now a resident of New York.

Record of New Railroad Construction.

Information of the laying of track on new railroads in the current year is given in the present number of the *Railroad Gazette* as follows:

Cairo.—Track laid from South Cairo, N. Y., to Cairo, 4 miles. Gauge, 3 ft.

California & Nevada.—Track laid from Oakland, Cal., east to San Pablo, 10 miles.

Fort Worth & Denver.—Extended northwest to Second Siding, Tex., 8 miles.

Galveston, Sabine & St. Louis.—Extended from Tatum Summit, Tex., south to Mineral Springs, 4 miles.

Green Cove Spring & Melrose.—Track laid from Green Cove Spring, Fla., west to Sharon, 10 miles. Gauge, 3 ft.

Houston, East & West Texas.—Extended from Sterne, Tex., northeast 35 miles. Gauge, 3 ft.

San Joaquin & Sierra Nevada.—Extended from Burson, Cal., east to Valley Spring, 15 miles. Gauge, 3 ft.

This is a total of 86 miles, making 255 miles thus far reported for the current year. The new track reported to the corresponding date for 14 years past has been:

	Miles.		Miles
1885	255	1878	258
1884	437	1877	232
1883	852	1876	308
1882	1,545	1875	183
1881	778	1874	303
1880	964	1873	535
1879	326	1872	778

This statement covers *main track only*, second tracks and sidings not being included.

NEW PUBLICATIONS.

Designing of Ordinary Iron Highway Bridges. By Prof. J. A. L. Waddell, C. E. New York, John Wiley & Sons.

This seems to be a careful and thorough work; perhaps a little too full in detail, but that is a pardonable fault, and the remarkably detailed and elaborate tables, 42 in number should be very useful, if they have been correctly computed, to the class for which the book is mainly intended, practical bridge-builders and students. No list of these tables (other than the index references) is given in the book, however, and the manner in which they are presented, on 42 folded broadsides, without even an indorsement on the back, will, we should think, be apt to be resented as an unpardonable—because unnecessary—imposition on the reader's patience. To find any one particular table in the lot is almost like looking for a needle in a hay-stack. Such defects give an immediate impression that a book has been slovenly prepared, which in other respects does not seem in this case by any means a just one. In fact, the general plan of the book is one which, if imitated as respects railroad bridges and thoroughly well done, would be almost sure to make a popular work having no very near rival. Elaborate treatises on the strains in bridges exist in plenty, but a work taking up the various details in succession in a practical way, pointing out the differences of practice which exist and the effect upon cost of construction and erection of various designs, as well as giving ready data by which the total cost, weight and other things important to know about a proposed bridge can be determined and compared together, is still a desideratum. It is this field, in substance, which the book before us attempts to cover for highway bridges, and it seems to cover it very creditably.

TRADE CATALOGUES.

Price List of the Eddy Valve Co., Waterford, N. Y.—This is an illustrated catalogue of convenient size, giving particulars of hydrants and of various descriptions of valves for steam, water and gas. A telegraphic code for ordering valves forms a useful feature of the book.

Hydraulic Engineering after the Holland Method for the Construction of Harbors, Breakwaters, Jetties, Shore Protection, Dams, Cribs, Levees, etc., etc. By R. Kanters & Sons, Holland City, Mich.

One does not often see a trade publication which is so exclusively "business," in the best sense, as this little pamphlet. The firm named are contractors for this kind of work, and the fact which they "make bold to assert," that "at the present time there is no person or firm in the United States who have a more thorough and practical knowledge of fascine works and their various uses than the senior of our firm," whose father and grandfather before him were contractors in Holland for this kind of work, is, we have reason to think, far more nearly strictly true than such statements often are. The contest with currents or waves is always an anxious one to an engineer, even when the conditions seem quite simple, and the advantage of having men who are at once contractors and experts to execute such works will often be felt to be no small one. The data contained in the pamphlet will in any case be of interest to those having to do with such works although there is nothing especially new in it to experts in such matters.

The New Orleans Exposition.

IV.

The exhibit of cars perhaps contained more novelties than the exhibit of locomotives noticed in a former issue, the Mann boudoir sleeping car, and the bay-window parlor car exhibited by the Pullman Palace Car Co., being as yet unknown to the great mass of the public, and though both forms of car have been illustrated in the *Railroad Gazette*, neither is yet in general use or has been previously exhibited.

THE MANN BOUDOIR CARS.

The Mann car shown was built by the Jackson & Sharp Co., of Wilmington, Del. The peculiarities of this car are many, and need little further description here. The division into compartments opening into a passage running along one side of the car certainly seems to combine the advantages of the compartment and the open car systems. Privacy in any compartment is secured by simply shutting the door opening into the passage, while communication with the rest of the train is as easy as with the ordinary style of car. From a traveler's point of view the compartment system has at least two distinct advantages. The majority of people using a sleeping car find it difficult to travel without having a sum of money in their possession. Some fastidious people consider a watch necessary, while many indulge in the luxury of a watch chain, a breastpin and earrings. Now, would any sane or sober person calmly go to bed, even in a first-class hotel, and leave his room door open? Yet this is precisely what is done in the ordinary sleeping car. If on awakening in the morning the traveller finds himself a poorer man, the question at once arises, Who has enriched himself at his expense, and the question is more easily asked than answered. It may be any of his 20 fellow-passengers, it may be the porter of his own or an adjoining car, it may be one of at least two conductors or a brakeman. Nor is this all; there is no certainty that the thief is on the train; he may very possibly have paid the car a hasty visit during a stoppage at a way station, and finding the porter taking his customary nap, have quietly appropriated his booty and departed. There is little security against robbery, and there is still less chance of detecting the thief.

In the Mann car, once the door of the compartment is bolted from the inside, no outsider can get in, and if anything is stolen from a sleeping traveler, the difficulty of finding the thief is considerably lessened; he must be among his three room-mates in that particular compartment. In the one case any one of some 30 people have a chance of stealing without any suspicion falling on them, and in the other, at the most three persons have the chance with the certainty of being at once suspected. Now, though it is true that robberies in sleeping cars are of infrequent occurrence, few people sleep the easier for knowing that their watch or money may be easily stolen with practically little chance of recovery.

Another point in favor of the Mann car is the greater amount of room available for dressing. The sleeper's head being immediately under the highest part of the car (the centre) instead of under the lowest (the sides), he has more room than when dressing in an ordinary sleeping car, in an awkward, half-sitting position on his berth. But as there is a compartment specially reserved for ladies (civilization has not reached the point of reserving a space specially for babies), there is a chance for an unfortunate male to dress in an ordinary perpendicular position without offending any of the proprieties. Without daring to penetrate the mysteries of a feminine toilet, it must be opined that the ladies would even more appreciate the chance of being able to dress much as if they were in a small bedroom with impervious walls, instead of being confined in a much smaller space, protected only by loose-jointed curtains from the gaze of any chance passer-by.

As a day car, the softer seats and the cushions giving support to the head and rest to the elbows, the Mann car must be pronounced not only a great improvement on the usual sleeping car of the day, but on the best day or parlor cars to be found east of Chicago.

The ventilation as far as the writer's personal tastes are concerned, is good, and that the current of air is ample is proved by the fact that though smoking is permitted in any part of the car, no smell of stale tobacco smoke is perceptible. The air in any compartment smells perfectly sweet a few minutes after two or three cigars are extinguished. The smoke seems to disappear as fast as created, and does not produce a minature Pittsburgh, as is too often the case when several smokers are hard at work in an ordinary car smoking room.

The Mann car exhibited, "Lucia di Lammermoor," is carried on two four-wheeled trucks. The construction of these trucks is, however, somewhat peculiar, and seems calculated to give the easy riding of a six-wheel truck, with less complication and dead weight. Each truck has two swing bolsters, each with its own set of elliptic springs. The wheels are wrought-iron, and the tires are secured to the body of the wheel by the Mansel fastening. The Raoul journal box is used.

THE PULLMAN CARS.

The Pullman Car Co. exhibited at H H 47 in the main building a parlor car, the principal peculiarity being the use of bay windows arranged in a somewhat similar fashion to those on a car for the Pennsylvania Railroad, already illustrated and described in the *Railroad Gazette* (May 16, 1884, page 380, and Aug. 29, 1884, page 630).

This car is one of 16 now building at the Pullman Works at Pullman, Ill. It is 9 ft. 6 in. wide inside and 70 ft. long. The main part of the car has 25 chairs covered with green plush, and nine additional passengers can be accommodated in the smoking room. A novel arrangement is introduced at one end of the car, where the seats can be converted into two couches for invalids. Curtains can be drawn around these couches to insure greater quiet and privacy if desired.

A buffet is provided, so that tea and coffee can be made and light meals served. The windows are large and lofty, with a small lift. The car is very handsomely decorated, embossed velvet, and gold and silver leaf oxidized being among the ornamental materials used. The blinds are of silk. The car is fitted with electric bells at every seat, the Baker Smith heater, Adams & Westlake lamps, lavatories, etc., for ladies and gentlemen, and is altogether exceedingly handsome and luxurious. It is supported on six-wheel trucks, with paper wheels 42 in. diameter.

It is understood that Pullman's Palace Car Co. would also contribute a sleeping car, but up to a recent date the space allotted for that car still remained vacant.

OTHER PASSENGER CARS.

The Jackson & Sharp Co., of Wilmington, Del., exhibit a Woodruff buffet sleeping car. This car is handsomely finished, but we understand was not specially built for exhibition. The interior finish is in mahogany, inlaid with brass and mother of pearl, with a water finish. The principal dimensions of the car are as follows:

Length over platforms	71 ft. 0 in.
Width outside	10 ft. 3 in.
Height over all	15 ft. 5 in.
Height inside	12 ft. 0 in.
Weight empty	60,000 lbs.

The Harlan & Hollingsworth Co., of Wilmington, Del., exhibit a first-class passenger car to seat 58 passengers. The trucks are M. C. B. standard, with 33-in. chilled wheels. The leading dimensions of the car are as follows:

Length of frame	49 ft. 6 in.
Length, including platforms	55 ft. 10 in.
Width of frame	9 ft. 6 in.
Height between shoulders of uprights	6 ft. 9 in.
Height from rail over all	13 ft. 6 in.

The interior is very handsome without being unduly extravagant, and this attractive appearance seems likely to be durable, a commendable endeavor having been made to avoid projections in the woodwork, which are liable to be knocked off or become defaced, and recesses which are certain to fill up with dust and are difficult to clean. A car which cannot be thoroughly cleaned and dusted soon looks shabby despite the most expensive and elaborate carving, and has anything but an agreeable smell.

The interior finish is chiefly in mahogany, relieved by a little red gum and some other Southern hard woods. The ceiling is wood, hand decorated. The seats are the Pennsylvania standard. A lavatory adjoins the saloon. Searle's steam heater is used.

The Chicago, Milwaukee & St. Paul Railway exhibits one of Harrison's bag-rack postal cars. This style of car is extensively use on this and other roads, and appears to be most conveniently arranged, and will well repay examination. In a future issue we hope to describe this car more fully.

The United States Fish Commission exhibits near the main entrance a full-sized car for conveying fish eggs, and in the Government building a model of Eastman's composite refrigerator car for the same purpose. It is mounted on Pennsylvania six-wheel passenger car trucks.

PASSENGER CAR FITTINGS.

Roberts' patent woven wire car seat is shown by the Hartford Woven Wire Mattress Co., of Hartford, Conn. This exhibit, unlike most of those relating to cars, is shown among the state exhibits, and will be found in the space allotted to Connecticut.

The Wakefield Rattan Co. exhibits some car seats with different styles of arms and framing, but all seated in rattan at I 2 in the gallery of the main building.

Gardner Holmes & Co., of New York, show seats for cars and railroad depots, and a section of the interior of the car showing blinds, fittings, etc. This exhibit is situated in the gallery of the main building at R R 2.

Some very handsome chairs, lounges, etc., are shown by Heywood Brothers & Co., of Gardner, Mass., at O O 2 in the gallery of the main building. The backs and seats are covered with stamped leather, some specimens showing the natural tint of the leather and others being bronzed and colored. The shape of the leather is retained by glued cloth pressed into the back of the leather and filling the impressions of the die. It is stated that the dye penetrates into the pores of the leather, and that therefore it retains its color under hard wear. As leather does not hold the odor of stale tobacco, it might be suggested that an agreeable improvement over the eternal plush would be leather seats in the smoking room of the next new thing in Queen Anne parlor cars.

Designers and builders of these palaces on wheels might also derive a useful hint from a study of a very handsome exhibit of furniture made by Mr. Robert Mitchell, of Cincinnati, Ohio. This furniture is in the Queen Anne style in light

colors, and its appearance is apt to create considerable envy in the mind of the average householder these hard times. The exhibit will be found in the gallery of the main building, adjoining the exhibits previously mentioned.

FREIGHT CARS.

Two Wickes refrigerator cars were exhibited. They were built by Pullman's Palace Car Co. for the Merchants' Dispatch, and are intended for conveying dressed beef.

A Tiffany refrigerator car loaded with butter was also exhibited. This is run on the National Dispatch line, and is owned by the Chicago, Boston & Liverpool Co.

One of Hutchins' refrigerator cars, as run on the Michigan Central, was also shown.

A box car, built for the same company by the United States Rolling Stock Co., of Urbana, Ohio, was also exhibited.

Two of the cars exhibited, a gondola and a box car, were built on the patents of the Tube Rolling Stock Co. The box car was built by the Gilbert Car Works, of Troy, N. Y.

The Roanoke Machine Works, in Roanoke, Va., in addition to the consolidation engine previously mentioned, also exhibit two freight cars built for the Norfolk & Western. One of these is a box car of 40,000 lbs. capacity. The weight of the car is 25,000 lbs. The other is a coal-car of the same capacity, but weighing 20,000 lbs. The bottom is fitted with dump-doors and the sides are 36 in. high.

The Allison Manufacturing Co., of Philadelphia, Pa., exhibits a box car which is fitted with several improvements. One of the doors runs on a top roller, and a sort of wedge on the bottom of the door wedges it fast when closed. It is also fitted with two varieties of grain doors, one on each side. Perry's automatic coupler is shown attached to the car. This coupler has a loose link and fixed pin, and can be operated from the side of the car.

The car itself is built in sections, for export to South America, and was sent to the Exhibition in parts and put together there. Each side is in three parts. The roof is also in three parts, joined together by bolts. Each end of the car is supported by a different kind of truck, one being swing motion and the other a rigid bolster.

An excellent and simple car-jack and a great variety of springs, axle boxes and numerous other car fittings are shown grouped around this car; and, altogether, the exhibit is one of the most interesting of its kind.

CAR WHEELS AND JOURNAL BOXES.

The Knoxville (Tenn.) Car Wheel Works send specimens of different styles of engine, truck and car wheels, and specimens broken to show the depth of chill. Two specimens of worn wheels, made from Carter County iron, are exhibited, and still show a fair tread, though the flanges have been worn square by their 16 years' service on the East Tennessee, Virginia & Georgia. This exhibit will be found at A A 49 in the main building.

The Raoul Journal Box Co., of Columbus, Ga., makes an exhibit of their form of journal at B 52. This journal is also shown under an engine built by the Baldwin Locomotive Works for the Central Railroad of Georgia, and is in use under some of the Mann sleeping cars running between New Orleans and Cincinnati and Atlanta.

The Lobdell Car Wheel Works, of Wilmington, Del., make a fine exhibit of chilled car wheels of different sizes and patterns, specimens of wheels broken to show the depth of chill, etc.

The Baltimore Car Wheel Works show car wheels, a special form of car truck, and a dust-tight journal-box.

Several styles and sizes of the Allen paper wheel are shown at A A 36.

A. Whitney & Sons, of Philadelphia, show a large collection of chilled wheels for various services, including baggage cars with wide treads, hand cars, lumber yard cars, mine cars, horse cars, etc. The exhibit also includes chilled tires for locomotives.

The Russell Wheel & Foundry Co. of Detroit, Mich., shows in an annex situated between the borders and the saw mill annex, west of machinery hall, a large collection of logging cars of different styles, and some automatic ore dump cars. This exhibit includes a large variety of chilled car wheels, which vary from 33 in. diameter and 530 lbs. weight to 7 in. diameter and 18 lbs. weight.

Butterworth & Lowe, Grand Rapids, Mich., also show several logging cars, including some for work on wood rails.

VARNISHES.

The Valentine varnishes are exhibited at M 3 in the main building, and several exhibits of white lead, etc., are shown in adjoining spaces.

Heywood, Wilkinson & Hardy, of London, exhibit a collection of paints and varnishes in the British section.

Foreign Railroad Notes.

The German statistics of accidents for September, 1884, in enumerating the causes, report that by *suicide* there were thirteen persons killed and *two injured!*

According to the United States consular report for November the Argentine Republic has 2,250 miles of railroad in actual operation and nearly as many more under construction or survey. This is a very much larger mileage than has previously been reported.

From the same source we learn that Buenos Ayres is better supplied with horse railroads than any other city of its size in the world. With a population of some 200,000 it has 80 miles of street railroad, carrying over 20,000,000 passengers annually.

The Spanish Department of Public Works reports that at the beginning of 1884 there were 5,126 miles of railroad in operation in Spain, of which 251 miles were private railroads, not serving as common carriers. Under construction were 714 miles. Besides these railroads there were 40 miles of tramways in operation and 70 miles more under construction.

A narrow-gauge railroad has been built, seven miles in length, connecting the lakes of Como and Lugano in Northern Italy. For 2½ miles there is a continuous rise of 1 in 20 (264 ft. per mile) with curves of 200 ft. radius. But by far the most remarkable thing about the road is that it cost the owners 6½ per cent. less than the provisional estimate.

There were in the employ of the Italian railroads in 1883 78,544 men—about 13 men to every mile in operation. The average wages or salary paid is about $200 per year. Their employments are classed as follows:

General management	3,672
Track service	30,058
Station service, etc	27,561
Trains and shops	17,253

The whole number employed was 7,976 (11 per cent.) more than the year before. Per mile of road the wages amounted to $1,411.

The railroad system of Japan is making progress. It has attained a length of 225 miles, and is increasing steadily. Its development is due mainly to the enterprise of the government, which sees the importance of a railroad system for strategic as well as commercial reasons. The system is being mainly built by the government with Japanese capital. A $20,000,000 loan, at 7 per cent. interest, was entirely taken up by the Japanese themselves. This is largely explained by the fact that Japanese business men habitually use but a small portion—perhaps 30 per cent.—of their disposable capital in active business, so that they have a large reserve available for investment in this way. The business results of the railroad management have thus far been satisfactory.

Statistics of rolling stock in Great Britain show that it has not increased there with anything like the rapidity with which it has increased here, even on roads that have not increased their mileage. From 1873 to 1883 the number of locomotives in Great Britain increased 31 per cent., while the increase in mileage was 15 per cent. On the New York Central in the same time the increase was 27 per cent. without increase in mileage. The number of passenger cars increased 31 per cent. in England, but only 13 per cent. per mile of road; the number increased only 4 per cent. on the New York Central. The increase in freight cars in England was 34 per cent. (15 per cent. per mile of road); on the New York Central the increase was 85 per cent. The freight car stock in this country increased very nearly 100 per cent. from 1880 to 1884, and though the increase in mileage meanwhile was nearly 40 per cent., there was still an enormous increase in the stock per mile of road.

Mr. Poliakow, a sort of Russian Tom Scott, though perhaps more a railroad contractor than a manager, proposes, under the auspices of the government, to consolidate all the Russian railroad companies into one, which should work the whole railroad system of the empire and construct and own all the new road. At present nearly all the Russian roads have dividends guaranteed by the state, and part of the dividends of most of them have to be advanced by it; these advances are a debt from the companies to the government, but it is payable only when the profits prove greater than they seem likely to grow. Mr. Poliakow proposes to fund these debts into a security payable when certain profits should be made, and he claims that by the union of the roads there would be such a saving in expenses that in no very long time the government would get interest on these advances.

The Prussian State Railroad management has had some sleeping cars constructed to run between Berlin and Aix-la-Chapelle, taking the place of the cars of the International Sleeping Car Co., of Brussels, whose contract expired last August and was not renewed by the railroad management. The new cars have two compartments in the centre, each provided with three berths and all other sleeping-car conveniences. At each end are second-class compartments, with reclining seats, but without berths. For a berth in a sleeping compartment the passenger must pay a dollar and have a first-class ticket. There is no extra price in the second-class compartments. The cars have three axles, with a wheel-base of 6.7 metres (22 ft.), and paper wheels. They are very elegantly finished and furnished. To avoid unnecessary disturbance of passengers the destination of each one is written on the outside of the car, from which alone can the compartments be entered.

THE SCRAP HEAP.

Affection in an Elevated Car.

Passengers on an elevated train going up-town the other night were treated to a pantomime quite as amusing as most performances which are witnessed from orchestra chairs. An affectionate young couple sat on one of the cross-seats, and close behind them was a mischief-loving messenger boy who listened to their low-voiced conversation and tried to translate it into sign-language for the benefit of others who were out of ear-shot. The young woman was vivacious and pretty, with most expressive eyes and a mouth so flexible that her words were almost visible. Her companion was a meek youth, and he seemed to be so much absorbed in the conversation as to be completely oblivious of his surroundings. The messenger put his hand to his ear and listened intently while the happy pair communed with their faces almost touching. Then the boy placed his hand on his heart, cast his eyes toward the ceiling of the car and by rapid contortions of his features managed to express mingled emotions of love and longing. He listened again and tore his hair in token of despairing love. After another pause he clasped his hands and twisted his body about to indicate that the young man was pleading a tender case. A bewitching look was in the young woman's eyes, and her lips, close to those of the young man, were set in such expectant curves that the passengers could hardly refrain from inquiring: "Why don't you kiss her?" The messenger had placed his fore finger in his mouth and had puffed out his cheeks until they seemed ready to burst. When he suddenly drew his finger out again there was a loud report like the popping of a champagne cork. The young couple looked startled and blushed, and the other passengers laughed heartily.—*New York Tribune.*

April-Fooling an Engineer.

Out on the Sackett's Harbor Branch of the Black River road, the residents conceived an idea, and proceeded to put it in practice. When the train for Watertown reached a point near Warren's half-way house, Engineer Teller discovered the figure of a man on the track a short distance ahead. He tooted the warning so vigorously that the index on the steam gauge went down on the left hand row of figures on a run. The figure still remained steadfast, and Mr. Teller, seeing that the train must be stopped, called for brakes in no uncertain tones. Conductor Perry blistered his hands on the rear platform brake, while the brakeman broke his back over the brake-wheel on the front platform. Engineer Teller aided their efforts by reversing the locomotive, which had now arrived so close to the expected victim that a maudlin countenance and battered plug hat were plainly visible. The train was stopped about ten feet from the man, and Mr. Teller went forward with fire in his eye to take the drunken vagabond from the rails. He barely touched the figure when the peculiar feeling of straw gave the sell away, and when he returned to his engine he drove it over the uncomplaining scare-crow in such a way as to make hash of its raiment.—*Watertown (N. Y.) Times.*

He Jumped.

"Yes," he answered, as he seemed to huddle himself up in a heap, "I've been there. That is, I've jumped from a railroad train running at a speed of 48 miles an hour, and I can't say as I want to repeat the experiment."

"Where and when?"

"About 30 miles east of Chicago on the Michigan Central, three years ago."

"What was the occasion?"

"I was half drunk and did it on a bet of $5. The bet was that I daren't walk out on the platform and take the jump without picking out my ground. As it happened, the ground was pretty clear, but $1,000,000 wouldn't hire me to try it again."

"How did you come out?"

"Well, it's hard to describe the sensation. As I sprang from the step I seemed to fly. I sailed along in the air until my wings grew tired, and then I dropped down to see the country. I've got a good pair of eyes, but I didn't see much. I was too busy turning cart-wheels and hand-springs and somersaults. Sometimes I beat the professionals all hollow, and again I made a muss of it. It was my intention to skip all the mud-puddles and avoid all the stumps, but you can't always have your way in this world. By-and-by I rested my case. That is, I brought up in a fence corner, and waited for a first-class hospital to come along."

"Much hurt?"

"Might have been worse. Broke an arm, two ribs, and had over a hundred cuts and bruises, and it was seven weeks before I could walk a rod."

"But you won the $5?"

"Y-e-s; but there is where I always grow sad. The stakeholder sent it back to me from the first town in the shape of a pine coffin, and it didn't fit my length into seven inches. I had to sell the confounded thing for a misfit at half price!"—*Detroit Free Press.*

Old Titles to Right of Way.

The Receivers of the Richmond & Alleghany road, which is built on the line of the old James River and Kanawha Canal, say in their annual report: "A series of maps is being prepared, which will show the complete alignment of the road, as well as the boundaries of the right of way and other real estate belonging to the company.

"Much attention has been given to the work of collecting and arranging the evidences of title to the right of way and the numerous outlying pieces of property belonging to the company. When it is remembered that some of these titles date back more than a century, and that many of the original papers were destroyed by fire at the time of the evacuation of Richmond in 1865, some idea may be formed of the amount of painstaking labor involved."

Well Officered.

A new Georgia company has a Major for President; a Colonel—rather in contravention of military rank—for Vice-President; Colonels for Treasurer and Chief Engineer, and a Captain for Secretary. The board of directors includes two captains, three majors, four colonels, two judges and one solitary untitled citizen, who must feel awfully lonesome. It is reported, however, that the untitled citizen aforesaid furnishes nearly all the capital, the colonels, etc., taking a share or two each.

Railroad Sociability.

"Speaking about the sociability of railroad travelers," said the man with the crutches and the watchpocket over his eye, "I never got so well acquainted with the passengers on a train as I did the other day on the Milwaukee & St. Paul. We were going at the rate of about 30 miles an hour, and another train from the other direction telescoped us. We were all thrown into each other's society and brought into immediate social contact, so to speak. I went over and sat in the lap of a corpulent lady from Manitoba, and a girl from Chicago jumped over nine seats and sat down on the plug hat of a preacher from La Crosse with so much timid, girlish enthusiasm that it shoved his hat clear down over his shoulder. Everybody seemed to lay aside the usual cool reserve of strangers, and we made ourselves entirely at home. A shy young man, with an emaciated oilcloth valise, left his own seat and went over and sat down in a lunch-basket, where a bridal couple seemed to be wrestling with their first picnic. Do you suppose that reticent young man would have done such a thing on an ordinary occasion? Do you think that if he had been at a celebration at home he would have risen impetuously and gone where those people were eating by themselves and sat down in the cranberry jelly of a total stranger? Why, an old man, who probably at home led class-meetings, and was as dignified as Roscoe Conkling's father, was eating a piece of custard pie when we met the other train, and he left his own seat and went over to the other end of the car, and shot that piece of custard pie into the ear of a beautiful widow from Iowa. People traveling around somehow forget the austerity of their home lives, and form acquaintances that sometimes last through life."—*Exchange.*

For the Babies.

As summer is coming on slowly, but we hope surely, the traveling public will feel interested in a suggestion recently made that one part of a car on each train shall be fitted up for a nursery, where the infantile portion of the community can have their nurses and their bottles, their paregoric and

playthings, their cries and comforts, without subjecting their mothers to apprehensions that the other passengers are annoyed by the little cherubs. As we have no interest in any railroad ourselves, and are entirely careless about the expense, we hail the suggestion with pleasure and throw it out for what it is worth. Perhaps some benevolent railroad company will try it. Why not?—*Raleigh (N. C.) News.*

Railroad Sanitation and Cholera.

General Manager C. H. Chappell, of the Chicago & Alton, has sent out the following circular: "The heads of departments and officers of the Chicago & Alton Railroad Co. in charge of property will, upon the receipt of this circular, have a thorough inspection made of all buildings, outhouses, grounds adjoining buildings at or between stations, cisterns, wells, ponds, vaults and sewers. The examination with reference to the character of the water supply for the use of passengers and employés must be very thorough; vaults or depositories of offal, garbage or sewage should not be located within 50 ft. of any source of water supply, or so placed as, under any circumstances, to drain into the water. The disposition made of night-soil, offal, garbage and sewage from every building should be ascertained, and if vaults or depositories need attention they should receive it before warm weather makes such work dangerous. The buildings and surroundings should be cleaned, aired, and, if necessary, disinfected with copperas, and those occupying, or in charge, notified that there will be frequent inspections, and if in future the condition is not satisfactory, it will be sufficient cause for their removal. To this end the General Manager desires that you at once take the necessary action with reference to the property of this company under your charge, or occupied by you, or those under you, and call the attention of the proper authorities to any unhealthy conditions existing upon property adjoining that owned by this company."

Similar orders have been issued by several other companies in response to the circular of the State Board of Health, which we published last week.

A Bad Hitching-Post.

Frederick von Hagen, a truck-driver, tied his horse and wagon to the rear of a train of empty oil cars on the West Shore track, in Weehawken, yesterday. During his temporary absence a locomotive was hooked on to the train. It started at a rather lively pace, dragging the horse and wagon with it. The animal kept up for about a mile, but the pace proved too much for him, and he fell down exhausted. When Von Hagen returned, it took him three hours to find the animal, which was badly injured. The wagon was scattered along the track.—*New York World, April 8.*

"Flannels."

Railroads in the Cape of Good Hope are owned and managed by the Colonial Government, which has somewhat singular ideas as to the essential qualification of the officials, experience, capacity and energy being all regarded as dangerous qualities. Consequently, it is not surprising to find the *Cape Argus* speak as follows: "We have one shocking example of the working head of a system of railways having no will of his own, and shrinking from exercising it.

"The tendency of the men of all grades is to take advantage of the inexperience of this high official rather than thank heaven for the remarkable benevolence of the man who has been set over them. The unfamiliar cognomen 'Flannels' has been playfully bestowed upon this gentleman, who, upon learning that an axle had snapped through the frost up country, had suggested that all axles in the government rolling-stock should henceforward be swathed in flannel, and 'Flannels,' I suppose, is the name by which the kind-hearted General Manager will be popularly known as long as his connection with the railway service lasts."

TECHNICAL.

Locomotive Building.

Messrs. J. & J. B. Milholland, in Pittsburgh, have just completed a mine locomotive for the Enterprise Mine of Hartley & Marshall. It has 6 by 12 in. cylinders and six 24-in. driving wheels.

The Car Shops.

The United States Rolling Stock Co. at Hegewisch, near Chicago, is building 60 box cars for the Louisville, New Albany & Chicago road. The machine shop is finished and most of the tools in position. A part of this shop is temporarily used for erecting cars. The erecting shop will be finished in a few weeks. Three large steam hammers are now being put in the blacksmith shop, and all the works will probably be in complete running order in another month.

The New York, New Haven & Hartford shops in New Haven, Conn., recently completed four new baggage cars for the road.

The LaFayette Car Works at LaFayette, Ind., have recently built 25 refrigerator cars, and are now running on an order for 400 box cars for the Louisville, New Albany & Chicago road.

The Illinois Central has given orders for the building of 500 box cars: 200 are to be built at their own shops and 300 by the Pullman Co. at the Pullman shops.

Bridge Notes.

The Passaic Rolling Mill Co., in Paterson, N. J., is building a draw-span 412 ft. long for the new bridge of the Minnesota & Northwestern road over the Mississippi River.

Iron and Steel.

The North Chicago Rolling Mill Co. started up its mills at South Chicago last week. The North Chicago mill will be closed down and no more steel rails will be made there, but work will be begun at once changing the rolls and making other necessary alterations in preparation for the manufacture of steel beams, channel and angles.

Keel Ridge Furnace at Sharon, Pa., has gone out of blast.

The United States Circuit Court has decided to order a sale of the Vulcan Steel Works in St. Louis under the mortgage, unless cause to the contrary is shown before April 18. The sale will include the right to manufacture rails of Bessemer steel.

The Joliet Steel Co. at Joliet, Ill., has contracts for steel rails to its full capacity for the present year and will take no more orders at present.

The Evansville (Ind.) Rolling Mill has been sold to J. T. Torrance and D. G. Cameron, who will remove the machinery to Chicago. The mill has not been operated for a number of years.

Manufacturing and Business.

The Dayton Manufacturing Co. in Dayton, O., is running on full time, employing over 100 hands on lamps, racks, door-locks and other car fittings, switch-locks, engine headlights and similar work. The company has furnished car fittings and other supplies to the Lake Shore & Michigan Southern, the Grand Trunk, the Canadian Pacific, the Chesapeake & Ohio, the Cincinnati, Hamilton & Dayton, the Baltimore & Ohio, the St. Paul, Minneapolis & Manitoba, and many other roads.

The Union Switch & Signal Co. in Pittsburgh has just completed the work of equipping the long wharf of the Central Pacific road at Oakland, Cal., with its system of interlocking switches and signals. The whole line along the wharf, and into and through the yards at West Oakland, is equipped with block signals, which are placed very near together, most of the blocks being only 1,500 ft. long.

The Rail Market.

Steel Rails.—The market remains steady and somewhat dull. Quotations for small lots continue at about $27@$28 per ton at mill for ordinary sections and $29@$32 for light rails. Large orders can be placed lower, and it is said that several for which there was a good deal of competition have been placed at $26.

Rail Fastenings.—The market continues dull, but quotations are nominally unchanged at 1.90@2 cents per pound for spikes in Pittsburgh; 2.25@2.60 for track bolts, and 1.65@1.75 for splice-bars. Few sales are reported, and all on private terms.

Old Rails.—There is some inquiry for old iron rails and the market is somewhat firmer, although not many sales are reported. Quotations may be put at $17@$18 per ton at tidewater and $18.50@$19.50 in Pittsburgh. Old steel rails are quoted at $16@$17 per ton in Pittsburgh, according to length.

Engineers' Club of St. Louis.

The Club met in St. Louis, April 1, Vice-President McMath in the chair; 30 members and 4 visitors being present.

Executive Committee reported that the resignations of Mr. E. Harrison and Mr. Samuel Rockwell had been accepted; also, that C. D. Lamb and J. C. Meredith had forfeited their right to membership by non-payment of initiation fee.

The amendment of Sec. 7 of the By-Laws, proposed at the last meeting, was adopted by a unanimous vote.

Prof. F. E. Nipher read a paper on "The Efficiency of a pair of Holtz Machines, one acting as Generator and the other as Motor," which was discussed.

Mr. K. Tully read a paper on "Construction in Wood and Iron."

A general discussion followed, and the Club then adjourned.

Engineers' Club of Philadelphia.

A regular meeting of this Club was held at its rooms in Philadelphia March 21, President J. J. de Kinder in the chair; 32 members and 7 visitors were present.

Mr. E. H. Hutchinson presented a geometrical proof of the well-known Latitude and Departure Method of Calculating Areas.

Mr. John Wood, Jr., exhibited working models of cars equipped with Curtis & Wood Automatic Car Coupler and fully explained its workings. Various tests of the models were proposed and successfully made.

The Secretary presented for Prof. L. M. Haupt a revision of his paper on Scales in Maps which he has prepared for the Club Reference Book.

The discussion on Strengthening the West Main Abutment of Chestnut Street Bridge was continued by the authors of the original paper, Mr. J. Milton Titlow, Prof. Haupt, Mr. Howard Murphy and Mr. Rudolph Hering.

Looking After New Cars.

It is often a matter of pride with car-builders to have a new car go out on the road and not make its appearance in the shops for 18 months or two years. We question whether this is good policy. Would it not be much better to have the car come in after six months' service, to have the rods and bolts tightened, cracks in joints stopped, and other precautions taken of a similar kind? When cars are built of timber which has not had a long and thorough seasoning, an overhauling is necessary after a few months on the road. When seasoning-cracks in paint and varnish are closed, the truck taken down, and all looseness due to shrinkage taken out, the car is better fitted to run two years or more without coming into the shop than it was to run a year when first completed. If the history of some of the oldest cars in service could be traced, it would be found that they had been well cared for at first. The life of a car is almost unlimited if the joints can be made weather-tight, the frame kept dry, and the slack of rods, braces and trusses taken up as often as shrinkage makes it necessary. Cars frequently become rotten at the window-sills and in the posts from weather cracks. These cracks make their appearance in many cars before the varnish needs renewal. Such cracks could be economically stopped without the necessity for re-varnishing. Sometimes the work can be done so quickly that the car will only be detained a few days in the shop. It is very important to have all the iron work of the truck perfectly tight. This prevents the joints from grinding and wearing. While these things are generally understood, they are too frequently neglected, and the result is a great loss to the roads. Cars, which should be sound and strong in their frames for twenty years, get out of shape in half that time. The only cause for this is neglect to keep the frame dry and the nuts and trusses tight.—*National Car-Builder.*

Roofing Slate.

A recent paper before the American Society of Civil Engineers by Don J. Whittemore, Past President and Chief Engineer of the Chicago, Milwaukee & St. Paul Railway, states that the failure of a lot of Pennsylvania black slate, which seemed to be of fair quality, but after six years use disintegrated so that nearly the whole of it had to be removed, caused tests to be made of 17 different varieties when a new and large supply was needed. Experiments were made as to comparative transverse strength, relative avidity for water as shown by capillary attraction, relative specific gravity, and relative absorption of water when immersed. Two slates of each variety were given to one assistant, and two to another, for the purpose of testing, each slate being given a distinctive number in a scale of 17 parts. Both assistants agreed in their determinations as to the position of each slate with reference to this scale. They were not acquainted with the price of any of the slate. From the determinations thus made a table was formed giving in separate columns the figures determined, and the cost of each variety, and an addition of these figures was considered as fairly showing their relative positions.

The slate offered at the *lowest* price gave the *best* aggregate, and was purchased. It was a green slate from Vermont, and has been used upon a large number of buildings, some of which have been in service over five years, and no complaint as to quality has been made. While it is not asserted that the deductions thus made can be in all respects considered a fair relative exponent of quality, in this instance the decision is apparently justified by experience.

The Brooks Locomotive Works Technical School.

At the annual distribution of prizes to the Apprentices' School of the Brooks Locomotive Works, which took place in Dunkirk, N. Y., on the evening of April 1, Mr. M. L. Hinman awarded the prizes upon the reports of the instructors, as follows: to Wm. H. Stickney, for proficiency in drafting, a position for the year in the drafting-room of the shop; to Charles H. Brown, the first prize for regularity of attendance, proficiency in studies, and rapid progress, $100; to William Foss, second prize, $75; William L. Gunther, third prize, $50; Thomas Meakim, fourth prize, $25; John Hefferman, fifth prize, $15; George A. Woodman, sixth prize, $10. Mr. Hinman made a brief speech on presenting the prizes, stating that the success of the school was such as to warrant its continuance, and then continued as follows: "I think no prize has influenced you in your attendance at school, but simply a desire to become better men, capable of filling better positions. We often receive communications, asking if we know of men competent to fill important positions, such as foremen, master mechanics, etc., and it is hoped that this school will be the means of qualifying you to become competent to fill such positions."

These words clearly express the purpose of the school. The modern improvements in machinery have in large part done away with the old-time machinist, able to do any kind of mechanical work. Some men run planers, others drills, and so on, and can do little else. The men who can do all the various kinds of work necessary in putting together a locomotive, or who understand the various steps to be taken, are few. The proprietors of the Brooks Locomotive Works endeavor to give their apprentices a good general training as machinist, such as will fit them to fill the places now occupied by the old-time artisans, who will soon drop away. Recognizing the fact that success can only be gained when the trained brain comes to the aid of the skilled hand, they have established this school.

New Method of Drawing Tubes.

Muntz's Metal Co. is manufacturing tubular coils upon an important new patent process. The mandril is dispensed with altogether, and tubes drawn 70 ft. or 80 ft. long, or longer, with a movable plug. No joint or brazing is required. Very large coils can now be manufactured with remarkable rapidity, and almost a revolution in this branch of tube-making is threatened.—*The Engineer.*

The Phelps Induction Telegraph.

A most interesting, as well as wonderful, experiment in telegraphy was successfully tried on Wednesday by the Baltimore & Ohio Telegraph Co. officials. They succeeded in telegraphing on a railroad train while going at the rate of 40 miles an hour by the Phelps induction system. [This system was described in the *Railroad Gazette* for Feb. 20 last, page 114.] The experiment was conducted by Mr. Phelps, the inventor, and under the direction of the B. & O. officials. Messrs. Joseph G. Pangborn, the Assistant General Passenger Agent, and Mr. McLaren, the Manager of the New York city B. & O. telegraph offices, went on the car, and Mr. Weaver, the B. & O. electrician, remained at the receiving office in New York. The experiment was tried on the Harlem River Branch of the New York & New Haven Railroad. Soon after the train was started, and while going at the rate of 40 miles an hour, the operator in the car called New York. A direct wire had been furnished through to Baltimore and into President Garrett's private office in the Central Building in this city. The gentlemen in the car awaited the answer with anxiety. Soon the instrument began ticking as loudly as if in a stationary office. New York had responded. The induction system worked. Major Pangborn then indited a telegram to President Garrett, saying that the Phelps induction system was a success. The telegram went direct to Mr. Garrett, and an answer was received by the experimenters on the car: "Your telegram has been delivered to President Garrett in his private office." Major Pangborn then wrote another: "President Garrett, I am telegraphing to you, on a train going 40 miles an hour, by the Phelps induction system. The wire in our car is 7½ in. from the wire laid on the ties of the track." While the operator was sending the dispatch, Major Pangborn noticed that the train had gone its 12 miles, and that it would soon pass over the wire in the wooden trench. He said nothing but let the operator continue. The train left the box behind. As it passed over the end there was a fainter sound of the ticking of the instrument, but the message continued. The induction was so strong that the current had gone to the wire on the telegraph pole 40 ft. from the track. It seemed marvelous to the experimenters. Sitting in a car with no wire nearer than 40 ft., and to send and receive messages! When the train returned the experiments were continued, and it was found that the inductor worked as well as on the other track. The message was sent over the wire in the wooden trench on the other track, 11 ft. away. Of course, there was a difference in the sound from the one received and sent when the car was over the wire and when 11 ft. from it. On the return the telephone was connected with the induction system and a message on a wire 60 ft. away was heard. The sender was in New York, and he was sending a message to his wife in New Rochelle: "I will not be home to-night. Business detains me in the city."

Mr. Phelps stated that a systems of bells could be placed on the engines and worked by the induction system, so that trains could telegraph to each other, and a system arranged so that when trains were within 1,000 ft. of each other a bell would ring announcing the number of the train ahead.—*Baltimore American, March 27.*

Electric Lights for Cars in Germany.

Some trains on the Frankfort-Fulda-Ulm Line are now fitted up with a dynamo placed in the baggage car on one side and accumulators on the other side. The dynamo, if driven at 750 revolutions, gives a current of twelve ampères, which by an automatic switch is sent into the accumulators. The dynamo is driven from one of the axles of the van, in a similar manner to the plan adopted on the London, Brighton & South Coast trains. The cost of installing the plant is given at $600 for dynamo, driving gear, and accumulators, and at $16 to $20 per passenger coach. The light itself is estimated to cost 1.7 cents per lamp hour.

Electric Motors on the New York Elevated Road.

The *Electrician and Electrical Engineer* is authorized to state that a special car built by the Pullman Co., to be fitted with motors, will be delivered to the Manhattan Elevated Co. in New York within a month. The necessary quantity of 70-lb. steel rails have been ordered for the central conductor, and the money is ready to pay for them. Whether or not electrical motors will be adopted for service on the elevated railway we are not prepared to say, but the prospects are now that a car driven by the agency of electricity, on the Second avenue line, will be running before the next Fourth of July.

New Buffet Parlor Cars.

The New York, New Haven & Hartford Co. has recently completed at its New Haven shops several new cars for the fast New York and Boston express trains. Among them are two buffet cars, the interior of which is finished in mahogany and varnished. The head lining is quarter-sawed oak and is very handsome. In the saloon are 21 Wheeler chairs upholstered in gold plush. The carpet is peacock blue, with old gold lines in the border. There are no sofas in the ends. The buffet has a plate-glass front reaching to the floor, and protected by three silver-plated bars. Two raw silk curtains drape the glass and are held in places by a pair of curtain knobs which contain enamel medallions. The glass and silver table of the buffet is set off by a panel behind it filled with crimson plush, and making a fine background for the display of the silver, glass and porcelain. At one side of the plate glass in the buffet, a panel affords room for several

very beautiful pieces of stained glass containing cut jewels, which gives the end of the car a very rich appearance. The windows are all provided with transoms, which are filled with painted and stained glass, the work being done on a kind of "crackle" glass, which produces a very brilliant effect. All the windows have folding brass screens, which are put in place when the windows are raised, and which to a great extent exclude the dust. The smoking room is upholstered in leather and has seats for six persons. The glass panels in this room are obscured, but have a delicate, transparent ivy leaf pattern. The transparent glass panels in the doors have a similar etched pattern. There are saloons at both ends of the car. The slabs in the toilet room are Tennessee marble. Though not expensively fitted up, these rooms are very rich and elegant. These cars are painted a dark olive on the outside, and have 42-in. paper wheels—*National Car-Builder.*

Luminous Paint for Gradient Posts.

On the Cape of Good Hope railways, where the ruling gradient is 132 ft. per mile, and changes of grade are very frequent, it is proposed that the figures on the mileage and on gradient posts should be painted in luminous paint, so as to be visible to the engineers and brakemen by night as well as by day.

Another Military Railroad.

Railroad building seems more brisk on the Red Sea than anywhere else just now. While the British troops are endeavoring to clear the way for the Suakim-Berber line, the Italian Government contemplates connecting Massowah and Kerem by a railway. The latter place would be chosen as summer quarters for the troops. Contractors have been applied to by the Italian War Office respecting the time requisite and the cost of the projected line.

Interior Finish of an English Passenger Car.

Engineering (London) thus describes the interior of a new passenger car on the Southeastern Railway: "The interior of the first-class smoking compartment is trimmed with maroon leather, and the non-smoking compartment with elegant tapestry. The panels above the trimming in both compartments are covered with ornamental Lincrusta-Walton, surrounded with bands of bird's-eye maple; the roof panels also are of the same material, richly gilded and decorated, and bold inside roof cornices have been introduced. Four mirrors in bird's-eye maple frames are placed over the seats in each first-class compartment. The second-class smoking and non-smoking compartments are trimmed with monogram carriage cloth. The panels of the roof, the sides, and above the seats are covered with ornamental canvas, bound with bands of Spanish mahogany, and a Spanish mahogany frame for notices, etc., is placed in each compartment.

"All the passenger compartments are fitted with adjustable blinds with transparent hair-cloth hangings, the rollers being concealed by ornamental wood cornices, which in the first-class compartments are of walnut, and in the second-class of Spanish mahogany, the moldings in the interior of both first and second-class compartments being of walnut and gilt.

"The upholstery for both first-class and second-class compartments is in plain style, without buttons, as the accumulation of dust in the folds of the lining, when buttons are used, renders it difficult to keep the compartments thoroughly clean. The seats and backs are so arranged that when retrimming is necessary the entire frames can be removed and fresh ones substituted. The interior of the compartment for guard and luggage is lined with sheet zinc."

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Allegheny Valley, annual meeting, at the office in Pittsburgh, Pa., April 14.

Atchison, Topeka & Santa Fe, annual meeting, at the office in Topeka, Kan., April 16.

Lake Shore & Michigan Southern, annual meeting, at the office in Cleveland, O., May 6.

Michigan Central, annual meeting, at the office in Detroit, Mich., May 7.

New York Central & Hudson River, annual meeting, at the office in Albany, N. Y., April 15.

New York, Chicago & St. Louis, annual meeting, in Cleveland, O., May 6.

New York, Susquehanna & Western, annual meeting, at Taylor's Hotel, Jersey City, N. J., May 7, at noon.

Vicksburg & Meridian, annual meeting, at the office, No. 51 William street, New York, May 4, at noon.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Atchison, Topeka & Santa Fe, 1½ per cent., quarterly, payable May 15, to stockholders of record on April 18.

St. Paul & Northern Pacific (leased to Northern Pacific), 1½ per cent., quarterly, payable April 15.

Housatonic, 1½ per cent., quarterly, on the preferred stock, payable April 15. Transfer books close April 8. This company drops from 2 to 1½ per cent.

Long Island, 1 per cent., quarterly, payable May 1. Transfer books close April 10.

Baltimore & Ohio, 5 per cent., semi-annual, payable May 15.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Association of American Railroad Superintendents* will hold its half-yearly meeting in Richmond, Va., on Wednesday, April 15.

The *American Association of Train Dispatchers* will hold its annual convention in Denver, Col., on Wednesday, June 3.

The *Master Car-Builders' Association* will hold its annual convention at the Hygeia Hotel, Old Point Comfort (Fortress Monroe), Va., beginning on Tuesday, June 9.

The *Master Mechanics' Association* will hold its annual convention in Washington, beginning on Tuesday, June 16.

The *Car Accountants' Association* will hold its annual convention in Minneapolis, Minn., beginning on Tuesday, June 23.

The *General Baggage Agents' Association* will hold its half-yearly meeting in St. Paul, Minn., on Wednesday, July 15.

The National Association of General Passenger & Ticket Agents will hold its next half-yearly meeting in New York, at 11 a. m., on Tuesday, Sept. 15.

The *Master Car-Builders' Club* will hold regular meetings at its rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.

The *New England Railroad Club* will hold its regular meetings at its rooms in the Boston & Albany station, in Boston, on the evening of the fourth Wednesday in each month.

The *Western Railway Club* will hold regular meetings at its rooms, No. 102 Adams street, Chicago, on the third Wednesday in each month.

The Western Pool Meeting.

A meeting of representatives of the roads west of the trunk lineswas held in Chicago, April 1, in response to the following call from Commissioner Fink:

"At a meeting of the Trunk Line Presidents' Committee, held this day, the Commissioner was requested to issue the following notice to the Western connections of the trunk lines: The trunk lines desire to maintain the established tariffs, and propose to take such measures as may be necessary for that purpose, with the co-operation of the Western roads, believing that the suspension of any of the Western pooling agreements does not do away with the obligation on the part of each company to maintain the agreed tariffs. They suggest that a meeting of the Western roads be held at Chicago at the earliest possible date, for the purpose of co-operating with the trunk lines, it being understood that there is a general desire on the part of the Western roads not to make any further reduction in the present tariffs. It is hoped they will be able to devise such measures as will enable them to strictly adhere to the established tariff. The Chicago & Grand Trunk Railway has agreed to remain a member of the Chicago pool until May 1, in order to afford more time for the adoption of measures to prevent a general demoralization in rates. In compliance with the above suggestion of the Trunk Line Presidents' Committee, I hereby call a meeting of the Western roads members of the Joint Executive Committee and such additional roads as members may invite, on Wednesday, April 1, at the Grand Pacific Hotel, at Chicago, at 11 o'clock. Will you kindly advise me whether your road will be represented, and what other roads, not members of the committee, you desire to invite."

Some 30 roads were represented, and Gen. J. H. Devereux was called to the chair. After a general discussion of the situation, the following resolution was adopted:

"*Resolved*, That it is the opinion of this committee that arrangements should be made for a division of traffic, governing the east-bound traffic from and passing through the territory west of the trunk-line terminus north of the Ohio River and east of a line drawn from Milwaukee, *via* Joliet, Streeter, Peoria, Seneca, and the Illinois and Mississippi Rivers to St. Louis."

A committee of 15, with Mr. M. E. Ingalls as Chairman, was appointed to prepare a plan of action.

After a recess the committee presented a report, which, after full discussion, led to the adoption of three resolutions: 1. For the appointment of a committee of 15 to prepare a plan for a western association to be submitted to the Managers at an adjourned meeting. 2. For a reorganization of the various pooling agreements on a permanent basis. 3. For an immediate restoration of east-bound freight rates on the basis of 20 cents on grain from Chicago to New York. The following gentlemen were appointed on the committee of 15: Messrs. John Newell, F. Broughton, James Smith, L. J. Seargeant, G. B. Reese, M. E. Ingalls, C. C. Waite, A. Mackay, F. Harriott, J. H. Stevens, William Stewart, D. S. Gray, J. H. Devereux, W. W. Peabody, W. Duncan, John R. Carson and O. B. Skinner.

The meeting then adjourned.

The committee met at once after the adjournment of the meeting, divided into sub-committees to consider the question of the reorganization of the several pools.

The committee meeting continued on the following day, the question of a permanent reorganization of the pools being still under consideration. Resolutions were passed for the appointment of a sub-committee to consider some plan to increase the rates from interior points so as to allow lines in the middle pool territory higher rates than they now receive. The various sub-committees reported progress, the chief obstacle met with being the refusal of the Grand Trunk to report Milwaukee business.

The following resolutions, submitted by Gen. Devereux, were unanimously adopted:

"*Resolved*, That a committee be organized and appointed, which may consist of seven or more skilled and experienced men, who shall carefully consider the existing laws governing and the practice obtaining in railroad construction and operation; that whatever change, alteration and protection, under law, is found to be reasonable and requisite, the same shall be set forth in prepared argument, together with all facts of the situation; that thus prepared, on or before the 4th day of July next, the committee shall call a convention to meet at the city of Philadelphia, inviting thereto, by special and particular notice and invitation, the railroad commissioners of the several states, transportation committees of Congress, including the Chief of the Bureau of Statistics, representatives of the commercial interests of the cities of Boston, New York, Philadelphia, Baltimore, Chicago, St. Louis, Cincinnati and other Western cities between the Mississippi Valley and the seaboard, together with representatives of American labor and manufactures.

"That the facts as found by the committee in their report and recommendations be there submitted and considered, and the results to be given the widest publicity for the knowledge and action of the people.

"*Resolved*, That this plan be recommended as the sense of this meeting to the principal Eastern roads, and that, if approved and accepted by them, the trunk lines, while receiving our co-operation, are respectfully urged to move in and direct the matter."

After arrangements had been made for the various subcommittees to continue their work at the most convenient points, the General Committee adjourned to meet again in Chicago April 15.

Southern Time Convention.

The spring meeting of the Southern Time Convention was held in New Orleans March 25. Mr. R. R. Bridgers presided, and 23 lines were represented. It was resolved that the schedules now in force for through trains be readopted for the coming season, with such local modifications as may be made by the several lines. Local changes, when made, to take effect not later than May 3.

Invitations were received to visit the Exhibition, and also to make visits to Jacksonville and Tampa, Fla.

After considerable discussion, it was decided to hold the fall meeting in New York, the time to be fixed by the President. The understanding is that should the General Time Convention meet in New York, this Convention will be held the following day. Should the General Time Convention decide to meet elsewhere, the Southern Convention will not be held until the following week. The convention then adjourned.

ELECTIONS AND APPOINTMENTS.

Bloomfield.—Mr. P. H. Blue is appointed Receiver of this road and has his office at Sullivan, Ind.

California & Nevada.—Mr. Calvin Pratt is Chief Engineer of this road, with office at No. 120 Sutter street, San Francisco.

Chesapeake & Ohio.—Mr. W. B. Ryder has been appointed Superintendent of Transportation in place of Mr. C. H. Hudson, who has gone to the East Tennessee, Virginia & Georgia. Mr. E. H. Barnes succeeds Mr. Ryder as Superintendent of the Huntington Division.

Chicago & Alton.—At the annual meeting in Chicago, April 6, John Crerar, Lorenzo Blackstone and John J. Mitchell were re-elected directors for three years, and Wm. A. Slater was chosen for two years in place of John F. Slater, deceased. The board re-elected T. B. Blackstone President; J. C. McMullin, Vice-President; Chas. H. Foster, Secretary and Treasurer; C. H. Chappell, General Manager; Chauncey Kelsey, Auditor; C. Beckwith, General Solicitor.

Chicago, Freeport & St. Paul.—This company has elected the following officers: President, William O. Wright; Vice-President, John F. Smith; Secretary, M. P. Wilcoxon; Treasurer, William P. Watson; General Agent, P. G. Hicks, of Minneapolis.

Chicago, Milwaukee & St. Paul.—The following circular from the President's office is dated Milwaukee, April 1.

"The board of directors of this company have elected Mr. Roswell Miller to the office of General Manager, taking effect this date."

Mr. Miller has been Assistant General Manager for several years, and Acting General Manager since the late Mr. Merrill was first disabled by sickness.

Chicago, Rock Island & Pacific.—Mr. A. H. Mackay is appointed Freight Agent for Oregon and Washington Territory, with office at Portland, Oregon.

Cincinnati, New Orleans & Texas Pacific—Mr. A. B. Southard is appointed General Agent at Louisville, Ky., in place of W. N. Culp, resigned.

Cincinnati, Washington & Baltimore.—At the annual meeting in Cincinnati, April 8, the old board was re-elected and subsequently re-elected all the old officers.

Cornwall & Mount Hope.—Mr. Karl von Schmalensee is Superintendent of this road, succeeding Mr. J. M. Harvard, resigned.

Denver & Rio Grande.—At the annual meeting, April 6, W. S. Jackson, T. H. A. Tromp and C. F. Woerishoffer were chosen directors.

Des Moines, Osceola & Southern.—The Iowa Circuit Court has appointed W. Wick Receiver of this road.

Fairmont & Gaston.—The directors of this new company are: James Morrow, Jr., James O. Watson, Fairmont, W. Va.; Henry G. Davis, Piedmont, W. Va.; J. N. Camden, Parkersburg, W. Va.; W. M. Clements, W. A. Hanway, T. F. Watson, Baltimore.

Fort Madison & Northwestern.—The United States Circuit Court at Keokuk, Ia., has appointed Charles A. Gilchrist Receiver. The appointment is conditional on the removal of the receiver appointed by the Iowa court.

Hopkinsville & Cadiz.—The directors of this new company are: H. G. Abernathy, W. G. Wheeler, S. G. Buckner, J. I. Landes, W. J. Withers, Lucian Jones, Hopkinsville, Ky.; M. H. Grinter, Dr. J. W. Grenshaw, Thos. C. Dabney, Cadiz, Ky.

Kentucky Central.—Mr. W. B. Ryder has been appointed Superintendent of Transportation in place of Mr. C. H. Hudson, resigned.

Kentucky & South Atlantic.—Mr. J. M. Kelly, recently Secretary of this company, has been appointed Auditor and General Passenger Agent. Mr. W. W. Layman has been appointed Master Mechanic in place of S. T. Hatfield, resigned.

Louisville & Nashville.—The following circular from General Manager R. Wells is dated Louisville, Ky., April 1:

"Mr. J. T. Harahan is this day appointed Assistant General Manager of this company, with office at Louisville, Ky.

"He shall have a general supervision of the train service; and his duties shall be to arrange all schedules for through trains and connections with foreign roads, to have supervision of the sleeping car service on the line; to see that the rules and regulations for the movement of trains and government of train-men are strictly carried out; and in case of accidents to trains, to see that a thorough investigation as to the cause is made by the division superintendents, and to report the same to the General Manager. He shall also assist the General Manager in exercising a general supervision over the track and road-bed, by making inspection trips over the line and branches at proper intervals, and shall report to the General Manager what, in his judgment, is necessary to maintain them in good and efficient condition and what improvements are demanded by the traffic.

"He shall also perform such other duties as may from time to time be assigned to him by the General Manager, and in his absence shall act for him.

"Division superintendents will honor his instructions in these matters, and give him their co-operation in all that tends to the efficient and economical operation of the line in these respects."

Mr. Harahan was for many years on this road and was General Manager for a short time. He left the road only a few months ago, to go to the Baltimore & Ohio.

Macon & Dublin.—Mr. Arthur Pou is Chief Engineer in charge of the surveys of this road, with headquarters at Dublin, Georgia.

Mexican Central.—At the annual meeting in Boston, April 6, the following directors were chosen: Oliver Ames, Isaac T. Burr, Benjamin P. Cheney, Jacob Edwards, Andrew B. Lawrie, Albert W. Nicholson, Charles J. Paine, Wm. Rotch, Warren Sawyer, George B. Wilbur, Levi C. Wade, Boston; Arthur Sewall, Bath, Me.; Levi C. Leiter, Chicago; Robert R. Symon, London, England; Sebastian Camacho, Charles C. Blodgett, Daniel B. Robinson, Mexico. The only new director is Mr. Blodgett, who succeeds Sr. Guzman, deceased. The board re-elected all the old officers.

Missouri Pacific.—A circular from this company announces that Mr. John Hewitt has resigned the office of Superintendent of locomotive and car department, and the office is abolished. Mr. O. A. Haynes is appointed General Inspector of locomotives, cars and machinery, with office in St. Louis.

In the reorganization of the Motive Power Department, Mr. L. Bartlett is appointed Master Mechanic, and Mr. John Hodge Master Car-Builder, with offices in St. Louis.

Mr. Wm. New is appointed Assistant Master Mechanic in charge of the Cypress shops, and Mr. E. Taylor Assistant Master Mechanic in charge of the Sedalia shops.

Mt. Holly & Denver.—Mr. M. Guion is Engineer in charge of surveys, with headquarters at Denver, Lincoln County, N. C.

New Castle Northern.—The following officers have been chosen as a compromise: President, James S. Negley, Pittsburgh; Vice-President, James S. Negley, Jr.; Secretary, Forbes Holton, New Castle, Pa.; Treasurer, W. R. Reed, Erie, Pa.

New York Central Sleeping Car Co.—Mr. F. H. Collett is appointed District Superintendent in place of W. S. Odell, resigned.

New York, Lake Erie & Western.—Mr. Wm. Litz has been appointed Master Mechanic of the Buffalo Division in place of Mr. G. B. Ross, resigned. Mr. Litz has been general foreman of the Buffalo shops for 10 years past.

New York, Philadelphia & Norfolk.—The officers of this road are as follows: A. J. Cassatt, President; Wm. A. Patton, Vice-President; Wm. Cariss, Jr., Secretary and Auditor; J. G. Cassatt, Treasurer; H. W. Dunne, Superintendent, Cape Charles, Va.; R. B. Cooke, General Passenger and Freight Agent, Norfolk, Va. General offices, 305 Walnut street, Philadelphia.

New York, Pittsburgh & Chicago.—Mr. I. F. Mansfield has been chosen Managing Director. Mr. C. F. Calhoun has has been appointed Auditor in place of H. T. Hanna, resigned.

Pennsylvania Company.—Mr. C. L. Kimball is appointed Assistant General Passenger Agent, with office at Cleveland, Ohio.

Pennsylvania Railroad Leased Lines.—At meetings held in Camden, N. J., April 6, directors were chosen as below by the companies named, whose roads are leased to this company: *Philadelphia & Long Branch*—William H. Wilson, Edmund Smith, Henry D. Welsh, John P. Wetherill, N. P. Shortridge, G. M. Dorrance, A. L. Dennis, F. Wolcott Jackson, William J. Sewell, C. B. Thurston, Lewis Perrine, Hugh B. Ely, W. W. Bannard. *Island Heights*—W. H. Wilson, J. B. Graw, M. F. Middleton, Hugh B. Ely, C. S. Sims, Edmund Smith, J. N. DuBarry.

St. Louis & Emporia.—The officers of this company are as follows: H. C. Cross, President; C. Hood, Vice-President; C. N. Stery, General Counsel; A. McKinney, Treasurer; W. E. Critzer, Chief-Engineer; W. C. Lemert, General Superintendent, Pleasanton, Kan. General offices, Emporia, Kansas.

St. Joseph & Western.—Mr. C. F. Smith has been appointed Auditor of this company.

Shenandoah Valley.—The United States Circuit Court has appointed Mr. S. F. Tyler receiver of this road. He is President of the company.

Silver Lake.—Mr. C. W. S. Nobles has been appointed Superintendent of this road.

Staten Island.—At the annual meeting, in New York, April 7, the following directors were chosen: Nathan G. Miller, B. Kreischer, Nathaniel Marsh, John W. Mersereau, W. W. MacFarland, Louis Dejonge, William King, J. H. F. Mayo, Charles Watrous, August Horrmann, R. W. Galloway, C. A. Canavetto, Erastus Wiman.

Sylvania.—The office of this company is at Sylvania, Ga.; the officers are: Maj. D. C. Bacon, president; Col. John C. Dell, Vice-President; Col. R. J. Davant, Secretary and Treasurer; John F. Lovett, Jr., Assistant Secretary and Treasurer; Col. S. L. Fleming, Chief Engineer.

Terre Haute & Indianapolis (Vandalia Line).—Mr. N. K. Elliott is appointed Superintendent of Transportation, with office at Terre Haute, Ind. The office of Master of Transportation is abolished. Mr. E. R. Darlow is appointed Assistant Superintendent, with office at St. Louis, Mo. Appointments took effect April 1.

Toledo, Kokomo & St. Louis.—The directors of this new company are: James K. Hamilton, Samuel R. Follett, T. P. Brown, Thomas L. Carpenter, William T. Walker, Henry A. Brown and Josiah M. O'Boyle.

Virginia Railroad Commission.—Mr. H. G. Moffett, elected Railroad Commissioner of Virginia by the Legislature, took charge of the office April 4, succeeding Col. George A. Martin, whose term has expired. Mr. Moffett has appointed Mr. H. H. Hurt his clerk.

Wabash, Chester & Western.—Mr. Robert Meek has been appointed Superintendent of this road.

West Jersey.—Mr. John C. Whittaker has been appointed Assistant General Freight Agent vice Walter Freeman, resigned.

Wisconsin, Iowa & Nebraska.—Mr. W. L. Dickson is Auditor and J. V. Johnston Local Treasurer, with office at Marshalltown, Ia.

PERSONAL.

—Mr. B. Phelps has resigned his position as Assistant Master Mechanic of the Missouri Pacific road in charge of the Cypress shops.

—Mr. Cyrus W. Field has resigned his position as a member of the Executive Committee of the Manhattan Railroad Co., and the Western Union Telegraph Co., intending to retire from active business.

—Mr. W. R. Woodard, now Receiver of the Texas & St. Louis road, has been offered the position of General Superintendent of the Louisville, New Albany & Chicago road, and will accept as soon as he can be relieved of the receivership. Mr. Woodard was for a number of years General Superintendent of the Hannibal and St. Joseph, and left that line to become General Manager of the Texas & St. Louis.

TRAFFIC AND EARNINGS

Coal.

Anthracite coal tonnages for the three months to March 28, as given by the weekly reports of the companies, have been, for eight years past:

1885	4,959,961	1881	5,918,828
1884	5,372,461	1880	4,696,974
1883	6,463,608	1879	5,132,261
1882	5,550,077	1878	3,040,240

This year's tonnage is the smallest since 1880. The decrease from last year is 412,500 tons, or 7.7 per cent.

Bituminous tonnages for the three months ending March 28, were:

	1885.	1884.	Inc. or Dec.	P. c.
Cumberland, all lines	472,446	444,856	I. 27,590	6.2
Huntingdon & Broad Top	38,287	46,621	D. 8,334	17.8
Barclay R. R. and Coal Co.	68,242	86,669	D. 18,427	21.2
Pennsylvania R. R.:				
Clearfield	747,330	671,305	I. 76,025	11.3
Penn and Westmoreland	237,041	302,945	D. 65,904	21.7
Minor districts	381,717	395,021	D. 13,304	3.4
Total	1,945,063	1,947,417	D. 2,354	0.1

Coke tonnages reported for the three months ending March 28 were:

	1885.	1884.	Inc. or Dec.	P.c.
Southwest Penn. R. R.	443,173	526,120	D. 82,947	15.8
Other districts, Penn. R. R.	135,721	130,740	I. 4,981	3.8
Connellsville, *via* Penn. R. R.	22,461	79,049	D. 56,588	71.6
Total	601,355	735,909	D. 134,554	18.3

The chief decrease is in the Connellsville district, the centre of the coke region.

Cumberland coal shipments for the week ending April 4 were 56,660 tons. Total to April 4, this year, 529,106; last year, 504,752; increase, 24,354 tons, or 4.8 per cent.

The coal tonnage of the Pennsylvania Railroad Division of the Pennsylvania Railroad for the three months to March 28 was:

	1885.	1884.	Inc. or Dec.	P. c.
Coal	2,418,319	2,340,666	I. 77,653	3.3
Coke	574,298	721,456	D. 147,158	20.4
Total	2,992,617	3,062,122	D. 69,505	2.3

This includes all coal and coke carried, whether originating on the line or received from other roads.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Three months ending March 31:	1885.	1884.	Inc. or Dec.	P.c.
Boston, Hoosac Tun. & W.	$96,199	$89,975	I. $6,224	6.9
Canadian Pacific	1,291,341	777,283	I. 514,058	66.2
Central Iowa	293,876	324,296	D. 25,420	7.8
Chi. & Alton	1,862,897	1,937,845	D. 74,948	3.8
Chi. & East. Ill.	379,423	343,939	I. 35,484	10.3
Chi., Mil. & St. P.	4,946,000	4,572,884	I. 373,116	8.2
Chi. & Nor'west.	4,778,900	4,773,418	I. 5,482	0.1
Chi., St. P., M. & O.	1,091,900	1,127,506	D. 35,606	3.1
Cin., Ind., St. L. & Chi	596,380	494,154	I. 102,226	20.7
Det., Lan. & No.	236,036	298,191	D. 62,155	20.8
Illinois Central	2,686,967	2,484,880	I. 202,087	8.1
Iowa lines	350,227	405,314	D. 55,087	13.6
Ind., Bloom. & W.	627,735	621,374	I. 6,361	1.0
Long Island	465,195	438,668	I. 26,527	6.0
Mil. & Northern	130,065	116,882	I. 13,183	11.3
Northern Pacific	1,809,973	2,113,143	D. 303,170	14.3
Ohio Central	243,093	244,821	D. 1,728	0.7
Roch. & Pitts.	250,658	221,610	I. 29,048	13.1
St. P., M. & Man.	1,433,750	1,556,535	D. 122,785	7.9
Two months ending Feb. 28:				
Ches., O. & S. W.	$227,704	$185,119	I. $42,585	23.0
Net earnings	54,964	16,455	I. 38,508	234.0
Chi., Bur. & Q.	3,594,400	3,619,234	D. 24,834	0.7
Net earnings	1,361,219	1,593,680	D. 232,461	14.6
Louisv. & Nashv.	2,254,057	2,054,748	I. 199,309	9.7
Net earnings	861,838	605,746	I. 256,092	42.2
Northern Pacific	1,123,546	1,134,187	D. 10,641	0.9
Net earnings	281,017	256,091	I. 24,926	9.7
Union Pacific	3,238,888	3,072,449	I. 166,449	5.4
Net earnings	867,274	423,790	I. 443,484	104.6
Month of January:				
Atch., T. & S. F.	$1,115,698	$1,172,348	D. $56,650	4.8
Net earnings	444,906	603,284	D. 158,378	26.0
Month of February:				
Ches., O. & S. W.	$112,185	$80,425	I. $31,760	39.5
Net earnings	29,058	1,992	I. 27,066	....
Chi., Bur. & Q.	1,601,915	1,971,013	D. 369,098	18.7
Net earnings	498,688	958,166	D. 459,478	48.0
Louis. & Nash.	1,083,308	1,015,431	I. 67,877	6.7
Net earnings	404,858	302,304	I. 102,554	33.9
Northern Pac.	569,964	520,085	I. 49,879	9.6
Net earnings	168,009	91,282	I. 76,727	84.3
Union Pacific	1,563,950	1,540,754	I. 23,196	1.5
Net earnings	380,884	268,599	I. 112,285	41.8
Month of March:				
Boston, Hoosac Tun. & W.	$41,137	$34,145	I. $6,992	20.6
Canadian Pac.	467,000	278,000	I. 189,000	68.0
Central Iowa	128,197	115,182	I. 13,015	11.3
Chi. & Alton	680,665	697,918	D. 17,253	2.5
Chi. & East. Ill.	147,065	111,048	I. 36,017	32.4
Chi., Mil. & St. P.	2,082,000	1,788,725	I. 293,275	16.4
Chi. & Nor'west.	1,938,500	1,766,900	I. 171,600	9.7
Chi., St. P., Min. & Omaha	451,000	464,200	D. 13,200	2.8
Cin., Ind., St. L. & Chi	224,440	201,150	I. 23,290	11.6
Det., Lan. & No.	96,377	115,689	D. 19,312	16.7
Illinois Central	960,867	844,609	I. 116,258	13.8
Iowa lines	145,127	142,159	I. 2,968	2.1
Ind., Bloom. & W.	227,088	193,223	I. 33,865	17.5
Long Island	177,226	164,975	I. 12,251	7.4
Mil. & Northern	53,345	47,187	I. 6,158	13.1
Northern Pac.	686,427	978,956	D. 292,529	29.9
Ohio Central	83,350	74,274	I. 9,076	12.3
Roch. & Pitts.	98,624	80,923	I. 17,701	21.8
St. P., M. & Man.	575,377	700,100	D. 124,723	17.8

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Cotton.

Cotton movement for the seven months of the crop year from Sept. 1 to April 3 is reported by the *Commercial and Financial Chronicle* as follows, in bales:

Interior markets:	1884-85.	1883-84.	Inc. or Dec.	P. c.
Receipts	2,525,949	2,695,699	D. 169,750	6.3
Shipments	2,398,166	2,619,451	D. 221,285	8.4
Stock, April 3	144,998	125,394	I. 19,604	15.7
Seaports:				
Receipts	4,579,287	4,619,661	D. 40,374	0.9
Exports	3,386,122	3,364,757	I. 21,365	0.6
Stock, April 3	667,326	689,142	D. 21,816	3.2

The movement is falling somewhat below that of last year at this season, and is likely to continue small.

The *Chronicle* says: "In the table below we give the receipts from plantations in another form, and add to them the net overland movement to April 1, and also the takings by Southern spinners to the same date, so as to give substantially the amount of cotton now in sight:

	1884-85.	1883-84.	1882-83.	1881-82.
Receipts at the ports to April 3	4,579,287	4,619,661	5,408,490	4,335,107
Interior stocks on April 3 in excess of Sept. 1	127,783	76,238	240,667	170,519
Total receipts from plantations	4,707,070	4,695,899	5,649,157	4,505,626
Net overland to Apr. 1	556,182	526,328	572,324	394,473
Southern consumption to April 1	217,000	336,000	240,000	190,000
Total in sight Apr. 3	5,480,252	5,458,227	6,461,481	5,090,099
Northern spinners' takings to April 3	1,175,585	1,298,752	1,454,826	1,322,570

"It will be seen by the above that the increase in amount in sight April 3, as compared with last year, is 22,025 bales, the decrease from 1882-83 is 981,229 bales, and the increase over 1881-82 is 390,153 bales."

Western Trunk Lines Association.

At a meeting held in Chicago, April 2, the arbitrators for the various roads in this Association decided that the Northwestern was still a member of the Association, and was, therefore, required to report all its Nebraska business. The company was given 30 days to comply with this decision.

The Western Passenger Meeting.

At the passenger meeting in Indianapolis last week, after a general discussion of the present situation, it was resolved to restore rates from all points on April 5. A committee was appointed to outline the territory to be controlled by a central passenger association, and to prepare an agreement under which rates can be restored and maintained and some penalty provided for violation. This committee was instructed to report to an adjourned meeting to be held in St. Louis April 9, to which all lines are to be invited to send representatives.

Mr. E. A. Ford, General Passenger Agent of the Pennsylvania Co., gives notice that at the adjourned passenger meeting to be held in St. Louis, April 9, he will bring up the question of rates from Chicago, St. Louis and other leading Western points, as well as the subject of rates through those cities, with a view to harmonizing differences and obtaining a complete restoration of rates from all points.

Southern Railway & Steamship Association.

A circular from General Commissioner Powers, dated New York, April 4, says: "The Executive Committee, at its session held in this city, Wednesday, April 1, ordered that rates to all points be restored from eastern cities at once to such figures as could be maintained by combination of locals with all-rail rates to Southwestern points.

"The Rate Committee met on the 2d and 3d of April, and, in accordance with the instructions of the Executive Committee, have made the following rates from eastern cities to Southern points named, taking effect at shipping points on all freight forwarded after this day, April 4. These rates must be strictly maintained by all lines."

The rates to leading points are as below, in cents per 100 lbs.:

	1.	2.	3.	4.	5.	6.
To Chattanooga from:						
Boston and New York	81	70	62	51	42	40
Philadelphia	75	64	60	49	40	38
Baltimore	73	62	59	48	39	37
To Atlanta from:						
Boston and New York	88	77	69	56	45	40
Philadelphia	88	77	69	56	45	40
Baltimore	81	71	64	51	41	37

Rates to other points are on the same general basis.

Transcontinental Association.

A circular from this association fixes commission to be paid on ticket sales to Pacific coast points on all business from the Missouri River and parallel points at $3 on first-class tickets, $2 on second-class tickets and $1 on emigrant tickets, and one-half of that amount on half tickets. As the lines between St. Louis and the Missouri River now pay a commission of $1, it is understood that, in order to equalize the same, an additional $1 will be paid on business from St. Louis by the Iron Mountain line or the St. Louis & San Francisco.

No commission will be paid on Pacific Coast business by the Oregon Railway & Navigation Co., the Oregon Short Line, the Atlantic & Pacific and the Central and Southern Pacific unless joint notice is given to the contrary.

Great Western Dispatch.

A Chicago dispatch says that this fast freight line has withdrawn from the Chicago & Atlantic, and will send all business to and from Chicago over the Pennsylvania Co.'s lines. This would seem to indicate a rupture between the Erie and the Chicago & Atlantic.

Central Iowa Traffic Association.

At a meeting of this Association in Chicago last week it was resolved to extend the present agreement for six months. The application of the Wabash for an increased percentage was referred to the arbitrator.

RAILROAD LAW

A Statute Against Train-Wreckers.

An act which has attracted a good deal of attention in the Ohio Legislature is as follows:

"SEC. 6,862. That it shall be unlawful for any person or persons, without proper authority, to place any obstacle upon any railroad in this state, or displace, injure or destroy anything appertaining thereto, or interfere with, remove, displace or disarrange any rail, crosstie, switch, side-track, locomotive, car, or train of cars, or other property of any such railroad, or interfere with, remove, displace, or disarranging any flag, lamp, or other signal attached to or employed upon any railroad car, or train of cars, locomotive, switch, or other property of any such railroad, or remove from, disarrange, or destroy any lock, fastening, coupling, or attachment on any track, car, switch, stand, tool-house, depot or other property of any such railroad. Any person violating any of the provisions of this section shall, upon conviction, be fined not more than $500 nor less than $25, and imprisoned in the penitentiary not more than 10 years, or in the county jail not less than 30 days."

Charter Exemption from Taxation.

In Washington, April 6, a decision was rendered by the Supreme Court of the United States in the tax case of the Chesapeake & Ohio Railway Co., plaintiff in error, against Joseph S. Miller, Auditor of the State of West Virginia, in error to the Supreme Court of Appeals of that state.

The question raised by this case is the constitutionality of an act of the Legislature of West Virginia, passed March 7, 1884, subjecting the property of the railway company to taxation. The company maintains that by an act of the Legislature of March 1, 1866, entitled "An act to incorporate the Covington & Ohio Railroad Co.," and another act passed Feb. 26, 1867, authorizing that company to consolidated with the Chesapeake & Ohio Railroad Co., it, as the successor of the latter corporation, was exempted from taxation so long as its profits should not amount to 10 per cent. of its capital; and that the subsequent act imposing taxation irrespective of this condition is void, because it impairs the obligation of a contract.

This Court holds that the acts from which the plaintiff in error derives its corporate existence and powers in West Virginia do not contain a renewal of the grant of exemption from taxation contained in the seventh section of the act of March 1, 1866; that the present company can in no sense be regarded as the identical corporate body of which it became the successor; and that all its rights as a corporation other than the title to the property it acquired by the judicial sale had their origin in and depended upon an act passed in 1871, and amended in 1877. Such being the case, the present company's charter rests upon a general law, which the constitution of the state declares to be subject to alteration and amendment, and therefore the exercise of legislative discretion in the matter of taxation cannot be complained of as a breach of contract. The decree of the Supreme Court of Appeals of West Virginia is affirmed.

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—This company's statement for January gives the following figures:

	1885.	1884.	Inc. or Dec.	P. c.
Miles of road	2,375	2,259	I. 116	5.1
Gross earnings	$1,115,698	$1,172,348	D. $56,650	4.8
Expenses	670,792	569,064	I. 101,728	17.8
Net earnings	$444,906	$603,284	D. $158,378	26.0
Per cent. of expenses	60.1	48.5	I. 11.6	....

The board, at its meeting in Boston, April 3, declared the usual quarterly dividend of 1½ per cent.

It is said that this company is making arrangements to extend its Wichita Branch westward to Dodge City, Kan., and also to extend the Southern Kansas line from its present terminus at Attica, Kan., to Medicine Lodge. The purpose of these extensions is probably to head off the proposed extension of the St. Louis, Fort Scott & Wichita road.

Bloomfield.—This road, which has been for some time past the Indiana section of the Indiana & Illinois Southern road, is now operated under its own name as the Bloomfield Railroad, a separate receiver having been appointed for it. The line of this road extends from Switz City, Ind., westward to Wabash, 32½ miles. The company was consolidated some two years ago with the Springfield, Effingham & Southeastern, afterwards named the Indiana & Illinois Southern; but as suits for foreclosure have been begun, a separate receiver has been appointed for this property, and the mortgage will be separately foreclosed.

Boston & Lowell.—The report that this company had added the St. Johnsbury & Lake Champlain to its system is confirmed. The road passes by a contract into possession of the Boston, Concord & Montreal Co., which is leased to the Boston & Lowell. The terms of the contract have not been fully made public, but it is known that as a part of the agreement the controlling interest in the road, which was owned by Messrs. A. D. Jewett, of St. Johnsbury; A. E. Folsom, of Lyndonville, Vt., and A. B. Harris, of Springfield, Mass., is sold to parties connected with the Boston and Lowell. Colonel Jewett, however, will probably remain with the road and retain some interest.

The St. Johnsbury & Lake Champlain road extends from Lunenburg, Vt., on the New Hampshire border, across Vermont to Swanton on Lake Champlain. A new line was built some two years ago from that point to a connection with the Ogdensburg & Lake Champlain at Rouses Point, but the use of this line has been discontinued since the Ogdensburg & Lake Champlain passed under the control of the Central Vermont. The control of this road not only gives the Boston & Lowell access to a large section of Northern Vermont, which its lines have not hitherto reached, but it can easily be used as part of a Montreal connection by building a very few miles of road, thus making the Boston & Lowell independent both of the Grand Trunk and the Central Vermont for its northern business, and making also its alliance of much greater importance to the Grand Trunk than it has heretofore been.

Notice is given that this company will issue 7,660 shares of new stock, par value $100 each. Stockholders of record on April 1 will be entitled to subscribe for one share of the new stock at par for each single share of old stock or each 5 shares of new stock held by them (the par value of the old stock of this company is $500 per share, and of the newer stock $100.) The right to subscribe will continue until May 5, and can be assigned. Payment for the new stock must be made in two installments, $50 at the time of subscription and $50 by July 1. Any stock not taken by the present stockholders will be sold by the board.

Cairo.—Work has been in progress on this road for some time, and it is now very nearly completed, all the rails being down. It is of 3-ft. gauge, and extends from the Catskill Mountain road, near South Cairo, to the village of Cairo, a distance of 4 miles. Cairo is the point from which all the stage lines for the eastern Catskill region start, and the new road will avoid the 4 miles of staging heretofore required. It will be entirely completed and open for traffic before the season of summer travel begins.

California & Nevada.—Track on this road is now completed from Oakland, Cal., opposite San Francisco, eastward to San Pablo, a distance of 10 miles. The grading is completed for 7 miles further and the company expects to have the road completed by November to Walnut Creek in Contra Costa County, 30 miles from Oakland. This section of the road will reach a fine fruit and farming country.

Central and Southern Pacific.—The *Commercial and Financial Chronicle* says: "The Central Pacific relinquishes the lease heretofore made of the Southern Pacific Railroad in favor of the new lessee, which assumes the same obligations, but the Central Pacific is not released from its obligations to pay rent to the Southern Pacific Railroad Co. in case there should be any default. The $1,200,000 minimum rental is in addition to, and independent of, the payment of fixed charges, included in which is the annual requirement under the Thurman Act. The (new) Southern Pacific Co. is a corporation with special charter (under the laws of the state of Kentucky), empowering it to acquire by purchase, or otherwise, bonds, stocks, obligations or securities of any corporation, company, association, individuals, state, territory and government, and to enter into contracts with corporations in respect to the same; to construct, establish, acquire, own, equip, lease, maintain and operate railroads, telegraphs or steamship lines in any state or territory of the United States or foreign country, and to buy, hold, sell and deal in all kinds of public and private stocks, bonds and securities. The capital stock, as fixed by the directors, is $100,000,000, of which upward of $86,000,000 has been issued, and the proceeds thereof invested in stocks and bonds of the controlled companies (aggregating about $110,000,000 par value), including the railroads between New Orleans and San Francisco, and the steamship line plying from New Orleans to New York.

"The lease is really one in which the public as investors and stockholders have very little interest, as it is another contract among those few distinguished capitalists who have control of the California railroad system and the Southern Pacific, and is in the nature of an agreement 'by themselves among themselves.' Such an agreement may presumably be modified or abrogated at any time by the consent of all the parties to it, and therefore an outside holder of securities cannot rely upon it as furnishing any permanent guarantee to his stock or bonds. The contract is one which is considered to be for the best pecuniary interests of the syndicate managing the respective properties or unquestionably it would not have been made."

Chicago, Burlington & Quincy.—The earnings and expenses of this road for February and the two months ending Feb. 28 were:

	February.		Two months.	
	1885.	1884.	1885.	1884.
Earnings	$1,601,915	$1,971,013	$3,594,400	$3,619 234
Expenses	1,103,227	1,012,847	2,233,181	2,025,554
Net earnings	$498,688	$958 166	$1,361,219	$1,593.680
Per cent. of exps.	58.9	51.4	62.1	56.0

The two months show a decrease in gross earnings of $24,834, or 0.7 per cent.; an increase in expenses of $207,627, or 10.2 per cent., and a resulting decrease in net earnings of $232,461, or 14.6 per cent. The heavy loss in February was due chiefly to the severe weather and frequent snow storms, interrupting traffic and largely increasing expenses.

Cincinnati, Washington & Baltimore.—The report presented at the annual meeting shows for last year, earnings, $1,854,307; expenses, $1,408,371; net earnings, $445,936; fixed charges, $692,072, leaving a deficit of $246,136 for the year.

Connecticut Railroad Legislation.—The Connecticut House of Representatives has passed the "Short Haul" bill, prohibiting the charging for the transportation of freight to any point a greater sum than is charged for the transportation of the like quantity from the same point of departure, and under similar circumstances, to a statio at a greater distance on the road in the same direction.n The bill was passed by a vote of 162 to 22.

Danville & New River.—*The Virginias* for March says: "This road is a narrow-gauge one that now is in operation from Danville, Va., westwardly, across about half of Pittsylvania, all of Henry, and over half of Patrick counties, to Stuart, the county seat of Patrick County.

"The following table, compiled from a map furnished *The Virginias* by its Chief Engineer, gives the altitudes, or elevations above tide, in feet, of the stations and stream and divide crossings of this road:

Stations.	Alt.	Stations.	Alt.
Danville	410	Meadow Creek	778
Junction	...	Preston	930
Dan River	477	Horse-pasture Creek	807
Buford Trestle	490	Spencer	855
Oak Hill	490	Spencer-Penn divide	932
D. M. & S. W. Junction	510	Penn	832
Cascade	574	North Mayo River	836
Pumpkin Creek	569	Mill-Mayo divide	993
Aiken Summit	792	Mill Creek Bridge	906
Axton	1,020	Mill-Spoon divide	1,158
Burnt Chimneys	970	Spoon Creek	1,003
Leatherwood Creek	645	Spoon-Mathews divide	1,305
Mulberry Creek	793	Mathews Creek	1,166
Martinsville Junction	925	Mathews-Solomon divide	1,301
Martinsville	979	Solomon Creek	1,175
Beaver Creek	699	Solomon-Rhodes divide	1,120
Waller	730	South Mayo	1,152
Smith River	707	Stuart	1,188

"These altitudes show how rapidly the general surface of Piedmont Virginia rises above Midland, in the counties traversed by this railway. The air-line distance from Danville to Stuart (Patrick C. H.) is 49 miles west by north, the railroad line between these points is 75 miles long."

Delaware Valley.—It is said that a company is shortly to be organized to build a railroad along the Delaware River from Easton, Pa., to Port Jervis, N. Y., and that the Pennsylvania Railroad Co., the Delaware Lackawanna & Western and the New York, Susquehanna & Western will all be interested in the new company. The line was projected many years ago, and several different companies have been organized to build it, but no portion of the line has ever been completed.

Denver & Rio Grande.—The committee appointed to propose a plan of reorganization have reported a plan under which fixed charges, exclusive of taxes and insurance, will not, it is claimed, exceed $1,500,000 for the years 1886 to 1889 inclusive. This is within the net earning capacity of the road during its worst year, when gross earnings per mile were $4,215. The holders of the present first-mortgage bonds and of car trust certificates, as a consideration for reduction of interest to 6 per cent., are to be given a first lien at the rate of not less than $7,600 per mile on the entire system, including the equipment. The holders of consolidated bonds, having less fixed charges preceding their lien, will get certainly 4½ per cent., which is the rate of interest stipulated for if earnings warrant before other securities shares therein. The plan contemplates the issue of a new first-mortgage of $30,000,000 on all existing property and franchises. Series A will amount to $10,000,000 gold, and mature Jan. 1, 1906, with 6 per cent. interest, payable quarterly; series B includes the remaining $20,000,000 in gold, and matures Jan. 1, 1916. For the years 1886 to 1889 inclusive, interest will be 4½ per cent., and after that 5 per cent., payable quarterly. To compensate for reduction of interest, each bond will carry with it a transferable non-cumulative income scrip certificate entitled to a *pro rata* not exceeding $25 gold per annum for years from 1886 to 1889 inclusive, and $20 gold thereafter out of any surplus remaining in any one year, after payment of interest on series A and B. A new second-mortgage, amounting to $20,000,000, in non-cumulative gold debentures, is also to be created, $11,000,000 being issued to execute the plan, and the balance held in reserve for the acquisition of new property when needed. The debentures will be payable at the pleasure of the company before Oct. 1, 1920, the rate of interest not exceeding 5 per cent.

Denver, Utah & Pacific.—This Colorado company will extend its line from the present terminus at Longmont, Colo., up the St. Vrain Cañon to stone quarries which are now being worked.

Des Moines, Osceola & Southern.—On application of several creditors of this company, the Iowa Circuit Court appointed a receiver for the road on April 2. The road is a narrow gauge line extending from Des Moines, Ia., southwest to Cainsville, Mo., 113 miles. It was intended to run to Kansas City. By the latest report issued the company had $879,000 first mortgage bonds outstanding. The net earnings for 1883—the latest year reported—were $47,520, or about $15,000 less than the interest on the bonds.

East Tennessee, Virginia & Georgia.—It will be remembered that when this road was put into the hands of a receiver by the United States Circuit Court, a suit was filed in the Georgia Superior Court under which that court appointed a receiver for the property of the company in the State of Georgia. Subsequently the case was removed to the Federal Court, the Georgia Receiver was displaced by the court and the whole line put in charge of Major Fink as Receiver under the Federal Court. Counsel for the parties who had begun the Georgia suit took an appeal from the Superior Court, and the Supreme Court has now decided that the transfer of the case was illegal and that the state court alone has jurisdiction. The Supreme Court holds that the East Tennessee line in Georgia was built under the charter granted by that state to the Cincinnati & Georgia Co., and that by direct legislative permission the Cincinnati & Georgia transferred all its property to the East Tennessee, Virginia & Georgia Co. Under this purchase, or consolidation, the East Tennessee, Virginia & Georgia became a Georgia corporation, and as such all suits brought against it by the citizens of Georgia are under the jurisdiction of the state court and cannot be removed to a Federal court on the ground that the company as a corporation is a citizen of another state.

What will be done under this decision is not yet known. Probably the original suit will be pressed and the court asked to make its appointment of a receiver permanent. This would at once bring the question of jurisdiction between the state and the Federal court to a point. The company may, however, take an appeal to the United States Supreme Court, which will involve a long delay.

Fairmont & Gaston.—This company has filed articles of incorporation in West Virginia to build an extension of the Gaston Railroad from Gaston mines, about 2 miles up the West Fork of the Monongahela, to a new tract of coal lands, where mines are now being opened.

Fort Madison & Northwestern.—The United States Circuit Court has made a provisional order appointing a receiver for this road in the foreclosure suit brought by the Union Trust Co. The order is to take effect provided the state court removes the receiver who has been appointed in that court and for whose removal a suit is now pending.

Fort Worth & Denver.—Both grading and tracklaying on this road are advancing steadily, and the track last week reached the second siding, 18 miles northwest from the old terminus at Witchita Falls. Stockyards are to be established at that point, from which shipments of cattle will be made for the present.

Fremont, Elkhorn & Missouri Valley.—Tracklaying on the extension of this road from Valentine, Neb., westward is to be begun next week. The road is graded for 140 miles, and the rails and ties for the whole distance are on hand or on the way, and the work will be carried out as rapidly as possible.

Galveston, Sabine & St. Louis.—This road is now completed and opened for business to Mineral Springs, Tex., 24 miles southward from Longview and 4 miles beyond the last year's terminus at Tatum Summit. The work is being pushed on the extension of the road southward.

Green Cove Spring & Melrose.—This road has been completed and is opened for business from Green Cove Springs, Fla. (where it connects with the Jacksonville, Tampa & Key West road and with the steamboats on the St. John River), westward to Sharon, a distance of 10 miles. Work is in progress on the further extension of the line, which is of 3-ft. gauge.

Gulf, Colorado & Santa Fe.—This company has made a proposition to extend its road from the present terminus at Lampasas, Tex., to Brownwood, on condition that the people of that town will give right of way, depot grounds and $5,000 in cash. The necessary amount has been already raised and the contract will probably be closed this week.

Hopkinsville & Cadiz.—This company has been organized to build a railroad from Cadiz, in Trigg County, Ky., westward to Hopkinsville, on the Louisville & Nashville road, a distance of about 20 miles.

Houston, East & West Texas.—Tracklaying on the extension of this road to Shreveport is now progressing rapidly, and the rails are reported down for 35 miles northeast from the late terminus at Sterne, Tex., leaving only about 3 miles to reach the Sapine River at Logansport. Between Logansport and Shreveport, La., 39 miles, the grading is all finished except 5 miles, and tracklaying will soon be resumed near Shreveport, where 8 miles of track were laid last year. It is expected that trains will run through from Houston to Shreveport in July.

Illinois Central.—This company's statement for March shows earnings from traffic as follows:

	1885.	1884.	Increase.	P.c.
Illinois and Southern Div	$960,867	$844,609	$116,258	13.8
In Iowa	145,127	142,159	2,968	2.1
Total	$1,105,994	$986,768	$119,226	12.1

The Land Department reports sales of 593 acres for $2,799, and cash collections amounting to $5,188 for the month.

It is said that this company is making arrangements to begin work shortly on the proposed extension of its Yazoo City Branch from Yazoo City, Miss., to Memphis.

Iron.—A suit has been begun in the United States Circuit Court in Cincinnati to set aside the sale of the Iron Railroad under foreclosure and the organization of the present company. The suit is brought for holders of the income bonds issued on the road when it was a part of the Toledo, Cincinnati & St. Louis. The road was bought at foreclosure sale by the holders of first-mortgage bonds, and the new company was organized in their interest, shutting out the income bondholders altogether.

Kansas City Belt.—This company has been incorporated to build a railroad from the present terminus of the Kansas City Belt road at State Line, westerly to a junction with the Atchison, Topeka & Santa Fe, and thence to a junction with the Union Pacific, about 15 miles west of Armstrong. The object is to make better connections for the present Belt road.

Kentucky Central.—A suit has been begun by Seasongood & Co., of Cincinnati, to recover on coupons of this company's bonds. The plaintiffs refused to enter into the agreement to reduce interest for three years, and the company would not pay them full interest, which they now sue to recover.

Louisville & Nashville.—This company's earnings and expenses for February and the eight months of the fiscal year from July 1 to Feb. 28 were:

	February.		Eight months.	
	1885.	1884.	1884-85	1883-84.
Earnings	$1,083,308	$1,015,431	$9,760 277	$9,849,613
Expenses	678.450	713,127	5,325,755	5.971,020
Net earnings	$404.858	$302,304	$4,034.522	$3,878,593
Per cent. of exp.	62.6	70.2	56.9	60.6

For the eight months the gross earnings decreased $489,346, or 5.0 per cent., but the expenses also decreased $645,265, or 10.8 per cent., the result being a gain of $155,929, or 4.0 per cent., in net earnings.

Louisville, New Orleans & Texas.—A dispatch from Vicksburg, Miss., says that at a conference held there last week the company accepted the city's proposition, which is in substance as follows: That the city will dismiss all suits against the company, which amount to about $250,000; vote an additional $100,000 in bonds to the railroad, bearing 5 per cent. interest; release the company from all city taxes for 99 years; surrender the $100,000 in stock now held by the city; give certain lands and allow the closing of a number of cross streets, and permit the location of the company's stations as ruled by the railroad. This will secure the location of the shops, unless an exorbitant price is asked for the ground on which to erect the shops, the company declining to pay exceeding $30,000.

Macon & Dublin.—A preliminary organization has been completed of this company, and the survey is now in progress of the projected line from Macon, Ga., southeast to Dublin in Lawrence County. The road will be 55 miles long, but it is not yet decided whether it will be of standard or narrow gauge.

Maine Railroad Taxation.—A dispatch from Augusta, Me., says that the following taxes have been assessed by the Governor and Executive Council against the railroads of Maine: Grand Trunk, $11,758; Bangor & Piscataquis, $319; Boston & Maine, $20,359; Eastern, $20,715; New Brunswick, $161; Maine Central, $42,245; Monson, $9; Portland & Ogdensburg, $1,376; Portland & Rochester, $1,280; Rumford Falls and Buckfield, $119; Sandy River Valley, $51; Somerset, $78; St. Croix & Penobscot. $72; Orchard Beach, $9; Green Mountain, $102; Bangor & Katahdin Iron-Works, $45; Bridgeton & Saco River, $44; Lewiston & Auburn horse, $25; Portland horse, $594; Knox & Lincoln, $719.

Manhattan.—The number of passengers carried on the elevated railroads in New York for the half of the fiscal year from Oct. 1, 1884, to March 31, 1885, was 52,613,246, against 50,051,179 in the corresponding half of last year; an increase of 2,562,067 passengers, or 5.1 per cent. The net earnings for the half year show a gain of $141,268.

Marietta Mineral.—This road is now running regular trains to Dunbar, O., 17½ miles from Marietta. The road is built on the abandoned line of the Marietta & Cincinnati road from Moore's Junction to Athens, which was given up when the new short line was built.

Meriden & Cromwell.—This road was formally opened for traffic April 6, and regular trains are now running. It extends from Meriden, Conn., eastward 11 miles to Cromwell on the Connecticut River, where connection is made with the Connecticut Valley road. It has been built by the manufacturers of Meriden in order to give them the water connection.

Minnesota & Northwestern.—The St. Paul *Pioneer-Press* says: "Mr. Raymond Du Puy, Superintendent of the Minnesota & Northwestern, has entered upon the duties of his office, and is making active preparations for the resumption of work upon the new road. The grading of the entire line from West St. Paul to Mona, a distance of 110 miles, has been practically finished, and nothing remains but the bridge work and the tracklaying. The tracklayers will be put at work at Cascade as soon as the frost leaves the ground. Cascade is 32½ miles south from St. Paul. Supplies of all kinds are now being carried to that point. The first track laid will be south from Cascade to the Cannon River, a distance of three-quarters of a mile. This will be built first to enable the builders to start upon the 184-ft. span bridge over the Cannon River. After this track is laid the tracklayers will return to Cascade, and then lay rails northward into West St. Paul. They are expected to reach there about May 1. The entire road is booked for completion by July 1. Abutments and piers for the bridge across the Mississippi have been completed, and the work is to be pushed rapidly. The iron drawbridge span, when completed, will be the largest in the world. It will be 412 ft. long, and when it is opened by being swung around on its centre, there will be a clear space of nearly 200 ft. on each side. The grade on the draw will be 53 ft. to the mile, with a curvature of 4 degrees. The piers will be on a 55 degree skew."

Minneapolis, Sault Ste. Marie & Atlantic.—Work will be begun shortly on the extension of this road from the present terminus at Bruce, Wis., across the Chippewa River toward the Wisconsin River. The contracts are to be let for 30 miles, but the company expects to build between 90 and 100 miles during the present year.

Mount Holly & Denver.—The incorporators named in the charter of this road have made a temporary organization and have appointed a committee to confer with the officers of the Carolina Central Co. In the meantime a survey of the road is in progress. The road will be about 10 miles long, extending from Denver in Lincoln County, N. C., southwest to a junction with the Carolina Central road.

New Castle Northern.—The litigation over this projected road has been closed by a compromise, and all suits are withdrawn.

New York Central & Hudson River.—This company gives notice that the Hudson River second-mortgage bonds, maturing June 16 next, will be paid at any time on presentation at the company's office in New York, with interest to date of payment. Interest on these bonds will cease on June 16. The amount outstanding is $1,422,900.

New York, Chicago & St. Louis.—A meeting of first-mortgage bondholders was held in New York April 6, at which about $10,000,000 of the bonds were represented. Resolutions were adopted setting forth that under the present management—controlled by the Lake Shore—a large floating debt had been allowed to accumulate, and that the receivership had been obtained for the purpose of protecting this debt and keeping the road under the Lake Shore control. It is further believed that the intention is to default on the June coupons on the first-mortgage bonds, while the bondholders believe that, under proper management, the road could earn the interest on those bonds.

A committee of seven, consisting of F. H. Cossitt, Adrian Iselin, Jr., Stephen Crowell, J. B. Newcombe, Thomas Denny, Charles E. Quincey and William R. Travers, was appointed to protect the interest of the first-mortgage bondholders, and was authorized to employ counsel and to take any steps that may be necessary to prevent the payment of any debts junior to the first-mortgage, or the creation of any lien by receiver's certificates, or otherwise, that shall be prior to the first mortgage. The committee was also authorized to make an assessment of $2 per bond for necessary expenses, and to procure proxies to be used at the annual meeting.

New York, Pittsburgh & Chicago.—At a meeting of the board in Pittsburgh last week it was decided to proceed at once to lay track on this road from New Galilee, Pa., to Chenton on the Pittsburgh & Western, and from Rodgersville west to New Lisbon, O. The grading on these sections—21 miles in all—is completed. The road is in operation from New Galilee to Rodgersville, 15 miles.

New York, Susquehanna & Western.—The United States Circuit Court has refused the application of James M. Boyd for the appointment of a receiver of the Pennsylvania Anthracite Coal Co. and the New York, Susquehanna & Western Railroad Co. He holds that the matter was a dispute among stockholders, and, although the companies might not be in a flourishing condition, the case was not one to call forth the intervention of a court of equity.

Northern Aroostook.—This company has been organized to build a railroad from Bancroft, Me., on the European & North American road, northward to Houlton, a distance of 38 miles. The Railroad Commissioners have approved the organization and authorized the company to proceed. The survey of the road will be begun at once.

Northern (New Hampshire).—In the suit of Roberts and others against the directors of this company, brought to compel a division of the surplus, an amended bill has been filed, charging the directors with retaining $100,000 of the purchase money of the Sullivan County road, and also with the appropriating of dividends upon the stock bought with surplus funds of the company and the profits resulting from the use of the company's funds for speculative purposes. The Court is asked to compel an accounting and also to remove the directors.

Northern Pacific.—This company's statement for February and the eight months of the fiscal year from July 1 to Feb. 28 is as follows:

	February.		Eight months.	
	1885.	1884.	1884-85.	1883-84.
Earnings	$569,061	$520,085	$7,751,765	$7,752,176
Expenses	401,955	428,803	4,110,679	4,575,440
Net earnings	$168,009	$91,282	$3,640,586	$3,176,736
Per cent. of exps.	70.5	82.5	53.0	59.0

For the eight months the decrease in gross earnings was $911; the decrease in expenses was $464,761, or 10.2 per cent., leaving a gain of $463,850, or 14.5 per cent., in net earnings.

Old Colony.—This company intends this season to extend the second track on its Main Line Division to Middleboro and Fall River. The Cape Cod Division and the Fairhaven Branch are to be relaid with steel rails. These improvements are to be completed before the summer travel begins for the season.

Oregon & California.—In the suit brought by the Oregon & Transcontinental Co. to restrain this company and the trustees from issuing any more second-mortgage bonds, the Court has vacated the preliminary injunction, holding that under the mortgage the trustees had a right to issue $10,000 a mile of these bonds, and the alleged agreement to restrict the issue to $2,610,000 had not been proved.

Oregon Improvement Co.—This company's statement for February and the three months of the fiscal year from Dec. 1 to Feb. 28 is:

	February.		Three months.	
	1885.	1884.	1884-85.	1883-84.
Earnings	$212,050	$225,123	$673,366	$758,788
Expenses	171,098	203,851	545,765	634,576
Net earnings	$40,952	$21,282	$127,601	$124,212

For the quarter the gross receipts decreased $85,422, or 11.3 per cent., and the expenses $88,811, or 13.9 per cent., the result being a gain of $3,389, or 2.7 per cent., in net earnings.

Pennsylvania.—This company has made arrangements to shorten up the time of its limited express, which will hereafter make the run between Chicago and New York in 24 hours, between New York and Cincinnati in 21 hours, and between New York and St. Louis in 29 hours. The time from New York to Chicago is an average of 38 miles an hour, without any allowance for stops, which will be the fastest long run ever made by any regular train.

Philadelphia & Reading.—The Philadelphia *Ledger* says: "The Master in the Reading Receivership has made a report to the United States Court recommending that the Receivers be authorized to make the New Jersey Central April payments for which they had petitioned. These are $202,500 interest on the consolidated mortgage, $48,000 other interest, and $170,000 on account of the car trusts, besides the $170,000 tax deposit already arranged. This report was regarded as foreshadowing the action of the Court, which may grant permission for the disbursements, amounting to $480,500, and hence the strength of the Jersey Central stock. The Reading general mortgages were bid up at the Stock Exchange upon statements that the coal trade was improving and arrangements were making for the payment of the January coupon. As it is easy for the Reading to now borrow on coal paper, it was thought that the money could readily be raised for this purpose, and the payment might postpone any hostile action by the general mortgage holders. The Reading officials were around among the banks again yesterday with their coal notes, and, as lenders are glad to get good paper at 6 per cent., much of it is being placed. The floating debt three years' extension project does not seem to progress. One large bank which has been discussing the matter pro and con for two weeks, finally left it to the President to decide, and that official was an object of much solicitude to the brokers who are endeavoring to carry out the plan. The statement was made that one-quarter per cent. commission was to be paid by the Reading for each renewal of notes under this arrangement, and this caused much discussion. It was thought that the unfortunate company now had enough load to carry without saddling it with additional expenses of this character. The Reading managers met yesterday and extended the time for assenting to the reorganization plan to April 25. It is understood that Judge McKennan is soon coming to this city to hold the United States Circuit Court, and it is then expected that something positive may be done in the Reading cases."

Portland & Ogdensburg.—The United States Circuit Court has appointed a special master to ascertain and state the amount of the indebtedness of this company. As soon as his report is made a final decree will be entered for foreclosure. The road will not be sold, but if it is not redeemed within six months after the entry of the decree, it will become absolutely the property of the trustees, subject only to the Receiver's debts and the mortgage of Nov. 1, 1870.

Richmond & Danville.—Holders of consolidated mortgage bonds maturing May 1 next are notified that until April 20 they will have the privilege of exchanging them for the general mortgage bonds of the company having 30 years to run. The bonds will be exchanged at par with adjustment of interest, the holder of consolidated bonds receiving new bonds with July coupons attached and 1 per cent. in cash. Applications for exchange must be addressed to the Treasurer in Richmond.

Rome, Watertown & Ogdensburg.—The freight house of this road at Cape Vincent, N. Y., was destroyed by fire April 4, with several cars. About 1,000 tons of hay and a quantity of other freight were destroyed, the loss amounting to about $50,000.

San Joaquin & Sierra Nevada.—Track is now laid to Valley Spring, Cal., 15 miles eastward from the late terminus at Burson and 56 miles from the starting point at Brack Landing, on the South Fork of Mokelumne. About 10 miles remain to complete the road to Mokelumne Hill. It is intended to push the road through to the Big Trees as fast as possible.

Shenandoah Valley.—This company defaulted on the April coupons on its general mortgage bonds, of which there are $4,050,000 outstanding. The default was generally expected, as the road has not earned its interest charges in any year since its completion, and for the past year the earnings have fallen off heavily. The road extends from Hagerstown, Md., to Roanoke Va., 238 miles, and has twelve miles of short branches. Its funded debt consists of $2,270,000 first-mortgage bonds, $4,055,000 general or second-mortgage bonds, and $1,590,000 income bonds. It is controlled by the Norfolk & Western Co., which owns nearly all the stock, and has been operated in connection with that road.

In anticipation of this default, apparently, application was made, April 1, to the United States Circuit Court for the appointment of a receiver. The court granted the application, and appointed Mr. Tyler, who was recently chosen President of the company.

South Carolina Railroad Commission.—In a suit brought by the Columbia & Greenville Co. to recover an assessment paid to meet expenses of the Railroad Commission, the Court of Common Pleas has decided that the law is unconstitutional. The case will be carried up to the Supreme Court.

Susquehanna & Mahoning.—This company has filed articles of incorporation in Pennsylvania to build a railroad 15 miles long in Jefferson and Clearfield counties, in the Clearfield coal district.

Sylvania.—This road is now substantially completed and will shortly be opened for traffic. It extends from Rocky Ford, Ga., on the Central Railroad, northeast to Sylvania, 18 miles. The grading and bridging was done by the people along the line and the Central Railroad Co. furnished the iron.

Tennessee Railroad Commission.—The Tennessee Legislature, largely for political reasons it is said, recently passed a bill to abolish the Railroad Commission. April 3 the bill was vetoed by Governor Bate, who held that the people demand a commission, and that it was his duty to stand by the pledges made in the Democratic platform. Immediately after the reading of the message the Senate and House passed the bill over the veto. The vote in the Senate was 22 to 10, and in the House 58 to 36. The commission bill was passed two years ago, and three Democrats were appointed by the Governor to act as commissioners. They were enjoined by the railroad companies from enforcing their schedule of rates, and were defeated last November by three Republicans. The Republicans were pledged not to serve if elected, their object being to secure the repeal of the law.

Texas & St. Louis.—It is understood that a plan of reorganization is to be submitted shortly to the bondholders, which will provide for the extension of the road from Bird's Point, Mo., to St. Louis, 155 miles, making the entire length of the road 890 miles. It provides also for the change of the road from 3-ft. to standard gauge. In order to pay for the extension and the change of gauge new first-mortgage bonds will be issued on the entire line at the rate of $12,000 per mile; the present first-mortgage bonds to be exchanged for income bonds and the income bonds for preferred stock. The details of the plan are not yet made public.

The bondholders' agents have informed the Court that the reorganization will be carried through and the road put in condition for the discharge of the Receiver as soon as possible. The report that the present Receiver has been removed and a new one appointed was untrue, or at least premature, although the present Receiver desires to be relieved as soon as possible, in order that he may accept another position which has been tendered him.

This company has made a traffic agreement with the St. Louis & Cairo providing for the exchange of business to and from St. Louis and points in Texas. Some three years ago, the company made an exclusive contract with the Illinois Central for St. Louis business, but the Receiver claims that he is not bound by that contract, and states that he will consider himself bound to take business from any road offering it.

Toledo, Cincinnati & St. Louis.—The Corbin Committee has issued a circular to the first-mortgage bondholders, in which they say that the bonds represented by them should now be deposited for use in the foreclosure proceeding. No assessment upon the bond is required, although a deposit of $5 for each $1,000 will be necessary to cover expenses, and it is stated that a further payment of $10 per bond may be needed hereafter, but that no further payment will be asked for. Bonds should be forwarded at once to the International Trust Co., for deposit under the terms of the agreement of May, 1884. The Committee states that it is impossible to say how much will be required to remove the indebtedness made a prior lien by the court and to put the property in good condition as a standard-gauge road. But no plan of reorganization will be adopted until a meeting of the bondholders has been called, the facts stated and their opinion taken as to what is best to be done. This meeting will be called as soon as a decree is had and the sale ordered, so that it is definitely known what will have to be met, but there will then be time to adopt a well-defined plan for the purchase of the property and its reorganization.

The committee will receive on deposit receipts for bonds deposited with the Quickley Committee, should holders who have so deposited them wish to change.

The Quigley Committee has issued a statement in answer to that of the Corbin Committee, in which it claims to have under its control $2,440,000 out of the $2,930,000 bonds of the St. Louis Division and $1,168,000 out of the $1,250,000 of the Toledo Division bonds, thus holding a very large majority of all the bonds.

Toledo, Kokomo & St. Louis.—This company has filed articles of incorporation in Indiana. The route laid down is identical with that of the Toledo, Cincinnati & St. Louis, and the incorporation is understood to be made by the bondholders, who expect to purchase that road.

Union Pacific.—This company's statement for February and the two months ending February 28, is as below:

	February.		Two Months.	
	1885.	1884	1885.	1884.
Earnings	$1,563,950	$1,540,754	$3,238,898	$3,072,440
Expenses	1,183,067	1,272,156	2,371,624	2,648,650
Net earnings	$380,883	$268,598	$867,274	$423,790
Per cent. of exp.	75.6	82.6	73.2	86 2

For the quarter the increase in gross earnings was $166,449, or 5.4 per cent.; the decrease in expenses was $277,035, or 10.5 per cent., the result being a gain of $443,484, or 104.6 per cent., in net earnings.

The treasurer offers to purchase, on or before June 1, 1885, any or all of the outstanding issue of its land grant bonds on the following terms: Bonds due April 1, 1887, 104¾ and interest; bonds due Oct. 1, 1888, 107¼ and interest; bonds due April 1, 1889, 108½ and interest.

Land sales in March were 165,198 acres for $440,241. For the three months to March 31 the sales were: Union Division, 156,819 acres for $263,940; Kansas Division, 95,330 acres for $391,181; total, 252,149 acres for $655,121, against 667,182 acres for $1,814,267 in the corresponding quarter of last year.

Wabash, St. Louis & Pacific.—It is reported that application will be made to the court, April 16, by the Receivers, to cancel 22 leases of branch lines of this system; this application will be based upon the report made by the Receivers of all the leased branches of the system for the period of May 29 to Nov. 30, 1884, which shows that only three of them earned a surplus over all expenses, including the rental, of $103,276, while 22 of them show a deficit of $1,051,119. The following is the showing of the report on which the court is asked to declare the forfeiture of the leases, the net deficit and surplus being from May 29 to Nov. 30, 1884:

Deficit:		Attica, Cov. & So.	$1 750
St. Jo & St. Louis	$77,212	Peo., Pek. & Jack'v'le	11,464
St. L., Ottawa & C. B.	24,293	Springfi'd & Northw.	35,760
St. L., C. B. & Oma.	3,013	St. L., Jerseyv'e & S.	50,8 8
Council Bl. & St. L.	87,538	Champaign & South.	2,045
Clarinda & St. Louis.	12,544	Hav., Rantoul & E.	20,2 5
Missouri, Ia. & Neb.	57 881		
Quincy, Missouri & P.	46,327	Total	$1,051,119
Centreville, M. & Alb.	10,138		
Des Moines & St. L.	37,508	*Surplus:*	
Des Mo. & Northwest.	9 557	Boone Co & Boone'v'le	$1,936
Red River	70,431	Brunsw'k & Chilic'e.	5,531
Tol., Peo. & Western.	117,242	Chicago Division	95,808
Champ., Hav. & W.	72 402		
Det., Butler & St. L.	24,096	Total	$103,276
Indianapolis Division.	10,354		
Cairo Division	169,7 9	Net deficit	$947,843

The Receivers have filed a report showing the number and amount of receivers' certificates issued by them under the order of June 6, 1884, authorizing the issue of $2,000,000 certificates to pay current indebtedness. The total amount issued is $380,000.

Wilmington & Weldon.—This company will receive proposals at its office in Wilmington, N. C., until April 25, for the grading, masonry and trestle work of a new branch running from the main line at Contentnea Bridge to Fayetteville, 70 miles. Bids will be received for the whole work, for one-half of it, or for sections of 10 miles. Further information can be obtained on application to Flemming Gardner, Chief Engineer, at Wilmington.